SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Dalkeith Gardens, County of Midlothian, in Lat. _____, Long. _____, Height above Sea 183 feet.

Distance from Sea 3 miles. During the MONTH of January 1852.

Days of Week.	Days of Month.	BAROMETER. 9h A.M. Barometer.	BAROMETER. 9h A.M. Attached Thermometer.	BAROMETER. 6h P.M. Barometer.	BAROMETER. 6h P.M. Attached Thermometer.	SELF-REGISTERING THERMOMETERS. Protected. Highest in Air.	Protected. Lowest in Air.	Exposed. Max. Black bulb in Sun.	Exposed. Min. Black bulb during Night.	HYGROMETER. 9h A.M. Dry bulb.	9h A.M. Wet bulb.	6h P.M. Dry bulb.	6h P.M. Wet bulb.	WIND. 9h A.M. Direction.	9h A.M. Force	6h P.M. Direction.	6h P.M. Force	RAIN. Days on which it fell.	RAIN. Amount.	CLOUD. 1 to 10	SUNSHINE. Hours.	THERMOMETERS. under Ground. ___h A.M. 3 inches.	12 inches.	22 inches.	Temperature of SPRING or WELL.	Temperature of SEA.	OZONE. 0 to 10	ELECTRICITY.	GENERAL REMARKS, As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	Days of Month.
		inches.	°	inches.	°	°	°	°	°	°	°	°	°					days.	inches.			°	°	°	°	°				
	1	30.15	43°	30.09	45°	49°	46°			48	43	48	46	S.		S.E.													Pasting clouds with fine intervals A.M. Showery	1
	2	30.07	45	30.10	46	51	45			44	43	51	49	S.		S.													Partialy overcast A.M. Dendely Do P.M.	2
	3	30.11	46	30.12	45	46	42			44	42	43	40	S.E.		S.													Do Do Do Do	3
	4	30.21	41	30.28	40	37	33			35	33	32	28	S.E.		S.E.													Cold cutting winds throughout	4
	5	30.32	37	30.28	36	35	27			34	33	29	31	S.E.		S.E.													Pasting clouds A.M. Dendely Do. P.M.	5
	6	29.98	34	29.80	34	32	23			28	27	36	36	S.E.		S.E.													Cloudy and cold throughout	6
	7	29.72	36	29.56	40	45	22			37	36	42	41	S.E.		S.E.													Pasting clouds with fine intervals A.M. Drizzly	7
	8	29.64	39	29.55	45	50	36			38	37	49	46	S.E.		S.E.													Fine and pleasant A.M. Overcast P.M.	8
	9	29.41	36	29.56	46	49	48			49	47	43	41	S.E.		S.E.													Seasonable A.M. Cloudy P.M. Heavy rain at night	9
	10	29.60	46	29.64	47	47	39			44	44	47	44	S.E.		S.													Pasting showers throughout the day	10
	11	29.63	42	29.90	44	39	33			38	36	38	37	E.		E.													Rain A.M. Showery P. Clear P.M.	11
	12	29.88	41	29.85	43	42	35			43	40	41	40	S.E.		S.E.													Fine for the season A.M. Spitting rain P.M.	12
	13	29.94	41	29.95	40	42	36			39	38	37	36	E.		E.													Chilly fine throughout the day	13
	14	30.03	41	29.99	43	46	36			42	41	45	43	S.E.		S.E.													Pasting clouds A.M. Dendely clouded	14
	15	30.04	42	30.15	45	49	41			43	41	46	44	S.E.		S.E.													Fine and pleasant A.M. Cloudy P.M.	15
	16	30.25	43	30.46	40	37	35			36	35	34	31	S.		S.E.													Cold and cloudy throughout	16
	17	30.40	38	30.20	42	40	27			36	35	41	39	S.E.		E.													Cloudy but fine A.M. Do Do Do	17
	18	30.08	42	29.99	47	49	38			44	41	48	45	S.E.		E.													Fine and mild for the season	18
	19	29.85	46	29.65	47	50	43			48	45	49	44	S.E.		E.													Cloudy and windy throughout	19
	20	29.39	43	29.61	42	41	38			41	38	39	34	E.		E.													Greyish white clouds passing A.M. Do	20
	21	30.10	36	30.36	36	33	31			33	31	34	31	E.		N.E.													Fine clear N.E. A.M. Passing clouds do	21
	22	30.35	34	30.29	42	42	25			30	28	36	35	N.E.		N.E.													Cloudy with fine intervals throughout	22
	23	30.28	37	30.30	38	41	33			34	33	33	32	N.		E.													Do Do Do Do	23
	24	30.28	39	30.20	41	42	25			43	41	42	40	E.		E.													Fine and pleasant A.M. Overcast	24
	25	29.99	40	29.78	43	45	31			40	37	42	39	S.E.		S.E.													Cold and cloudy throughout	25
	26	29.87	40	29.83	38	39	35			38	35	31	31	S.E.		E.													Do Do Do Do	26
	27	29.82	36	29.87	36	34	26			31	31	32	31	S.		S.E.													Pasting clouds A.M. Cloudy throughout	27
	28	29.89	36	29.80	39	43	29			34	33	43	41	S.		S.E.													Pasting clouds with fine intervals A.M. Cloudy	28
	29	29.83	39	29.68	43	48	34			39	38	47	46	S.W.		S.E.													Cloudy A.M. Windy rain P.M.	29
	30	29.34	46	29.52	47	52	44			52	50	40	38	S.E.		W.													Cloudy and showery A.M. More settled	30
	31	29.53	40	29.35	38	39	29			35	33	34	33	S.E.		N.E.													Fine and pleasant A.M. Cloudy throughout	31
	Sums.	928.16	1244	929.34	1344	1347	1073			1252	1135	1240	1181						2.3 in.											
	Means.	29.935	40.13	29.978	43.35	43.45	34.61			39.42	36.58	40.00	38.09						0.07											
	Index Errors.																													
	Correction for Diurnal Range.‡																													
	Corrected Means.																													
	No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		

Barometer, mean corrected reading of Column No. 1 (A.M.),..... = 29.935 Column No. 3 (P.M.),..... = 29.930 Barometer, Highest observed reading of Month,..... = 30.45 on the 16th

Diameter of tube _____ inch; correction for capillarity to be added,..... + 0.60 Capillarity,..... = + 0.60 Lowest do. do.,..... = 29.34 on the 30th

Sum,..... 29.995 Sum,..... 29.990 Difference, or Monthly Range,..... = 1.11

Correction for Temperature from Column No. 2 to be deducted,..... = − 0.24 Temp. from Col. 4,..... = − 0.30

Sum,..... 29.971 Sum,..... 29.960

Mean of the above 29.965

Correction for Height above Sea-level, _____ feet, to add,.....

Barometer corrected and reduced to 32° and Sea-level, ...

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	
A.M.	1	0	0	9	5	10	5	1			31 days
P.M.	0	0	2	5	3	11	7	3			

Dry bulb Thermometer (mean of Cols. 9 and 11),* ..... 39.

Wet bulb Thermometer (mean of Cols. 10 and 12),* ..... 37.

† Dew-point Temperature,..... 34.0

† Elastic Force of Vapour,..... .204 inch

† Weight of Vapour in a Cubic Foot of Air,.....

† Additional Weight required to Saturate a Cubic Foot,.....

† Degree of Humidity (Saturation 100),..... 85

Highest Reading Self-Registering Thermometer in Air and Protected, ... 52.0 on the 30th

Lowest do. do. do., ... 22.0 on the 7th

Difference, being Monthly Range,..... 30.0

Mean of Self-Registering Thermometers in Air and Protected, ... 39.0

Mean Daily Range in Air and Protected, ... 8.8

Greatest Daily Range, do., ... 23.0 on the 7th

Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... on the _____

Lowest do. do. from Radiation during Night, _____ on the _____

(Signed) W. Thomson

(Designation) Gardener

Corrected by John 1st

* If the readings are taken at 9h and 3h, the 9h readings to be alone taken to account, as the correction for Diurnal Range in Scotland is unknown.

† All these calculated from Glaisher's Hygrometric Tables, Second Edition *only*.

‡ The Diurnal Range for Scotland is as yet unknown.

N.B.—This Schedule should be returned (post-paid) as early as possible after the completion of the Month, with the Sums correctly added, and the Means deduced. No Wax or Wafers ever to be employed in closing the Schedule—the Gummed Corner to be alone used.

213.4
34.6 - 8
2178.0
39.6

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

THOSE persons who kindly furnish Monthly Tables of the Weather to the Scottish Meteorological Society are requested to attend to the following Instructions, seeing that the most important ends of Meteorological Observation—being comparable with one another; and for this purpose it is requisite that all should, if possible, observe at a like hour, in a like manner, and have their instruments placed, in so far as circumstances allow, in a like position:

Hour of Observation.—All instruments which are observed twice a-day, should be read at the same hour morning and evening, in order to furnish mean results. The Society recommends *a quarter before nine o'clock morning and evening* as the most convenient hour; but should this be inconvenient for the observer, another hour may be chosen, attending however, to the above rule, that the evening and morning readings be taken at the same hour, and this hour entered on the Schedule.

Barometer.—Barometers of Messrs Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined, in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will strike against the upper end of the tube with a sharp tap. The mercury should then completely fill the tube. If any air has got admittance, it should be driven into the cistern by reversing the instrument and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

The Barometer should be hung in a good light, and perfectly perpendicular, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading, to prevent adhesion of the mercury to the tube. In reading, the eye ought to be placed on the exact level of the top of the column of mercury. The reading of the attached Thermometer ought to be the first taken, as the heat of the breath, or the proximity of the person, are apt to influence its readings.

The corrections necessary to be applied to the Barometric readings depend on the form of the instrument. The mode of making these corrections, and the tables employed for the purpose, will be found in the "Report of the Committee of the Royal Society on Physics and Meteorology," 1840, price 1s. The daily readings of the Barometer ought to be entered on the Schedule *as read off*, and the corrections only applied to the mean for the month.

Self-Registering Thermometers and Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as near as may be *four feet* from the general surface of the ground. Different contrivances are used for this purpose, either a double ventilated box with louvre-boarded sides, fixed at a north window, and projecting 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in a double ventilated box with louvre-boarded sides, fixed in an exposed place, and if possible over grass. Whatever means, are finally decided on, the position of the instruments should be noted in the Schedule, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

The *Self-Registering Thermometers* should be placed exactly horizontal. In the case of the ordinary *maximum* Thermometer, with clay, glass or steel index, the bulb may be *very slightly* elevated, in order that the mercurial column may be somewhat aided by the force of gravity in pushing forward the index; and in the case of the *minimum* Thermometer, the bulb must be slightly depressed, to prevent a draining of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These Thermometers, if read once a-day, should *always be read on the evenings*, so that the temperatures registered by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float nearest the *head of the column* of mercury or of spirit.

The *maximum* Registering Thermometer, for taking the extreme heat of the sun's rays, should have its bulb blackened and the surface rendered dull, and it should be mounted in a blackened box, whose sides should be so high as to protect the bulb from wind. It should be so placed that the sun's rays have free access to it during the heat of the day.

The *minimum* Registering Thermometer, for ascertaining the lowest temperature during the night from radiation, should have its bulb similarly blackened and rendered dull, and be similarly mounted. It should be laid out, about sunset, over grass, in a place freely exposed to the sky, but raised on wooden supports a few inches above the surface, and removed during the day.

Hygrometer.—The *wet* bulb requires the muslin covering it to be often changed. In towns once a month, or oftener if the weather is dusty, and the muslin gets foul; in the country whenever the muslin seems to be foul. The bulb should always be covered with thin tissue or blotting paper below the muslin, and the muslin should always be thoroughly wetted, and freed from superfluous water before being used; and the cotton wick which conducts moisture to it should be previously soaked in a solution of carbonate of soda, and then in pure water, before being attached, in order that it may be thoroughly wetted, else it will conduct the moisture imperfectly, and yield false results. In frosty weather, water must be poured over the wet bulb, so as to form a thin film of ice on the muslin, the evaporation from the ice going on as from the simply wetted bulb.

Rain Gauge.—As Mr Fleming's Rain Gauges" seem to possess several advantages over others, the Society gives the preference to them; but whatever form be employed, in order that all the stations may yield comparable results, it is recommended that the Gauge be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of *close cut grass*, in a place as distant as possible from trees, houses, high walls, and irregular or broken ground, and the quantity of Rain should, if possible, be registered daily. When more than one Rain Gauge is kept, they ought to be placed near each other, but at different heights above the ground, and their indications noted in the *general remarks*, mentioning their height above ground—the regular column in the Schedule being reserved for the ground Rain Gauge alone.

Winds.—Elevated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately over head, that is, in or near the zenith of the observer. The motion of the higher strata of clouds gives no such indication. Failing the clouds, the general direction of the smoke of a hamlet or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. For mode of estimating the force of the wind, see "Directions for Reading Instruments;" but in all cases it is better to make use of Lind's Anemometer, as prepared at Messrs Adie and Son's, and enter the greatest force of the wind during the period of observation.

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, *so long as it is above the horizon*, is thought by some eminent astronomers to have a powerful effect in dispelling clouds, it would be well to note in the General Remarks any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

Sunshine.—The number of hours the sun shines during the day should be entered in the proper column.

Thermometers under Ground.—Though the temperature and hygrometric conditions of the air are those which chiefly influence the growth of crops, it is important for the health of the crop, and for the germination of the seed, that the soil itself should have a certain temperature. To collect facts which may illustrate this, it is recommended to have Thermometers sunk 3, 12, and 22 inches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil; and the observer should enter in the Schedule the *kind* of soil; whether drained or undrained; and whether naturally wet or dry.

Temperature of the Sea.—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river water, and as near as may be about the time of high water. A Thermometer, with its bulb fixed in a small tin pitcher, covered with a sloping lid, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. Convenient instruments are furnished by Messrs Adie and Son.

Temperature of Springs.—The temperature of Springs or Deep Wells is recommended to be taken whenever practicable, mentioning whether Spring or Well, and its depth from the surface.

Meteors, Aurora Borealis, Remarkable Depression or Elevation of Barometer, Remarkable Falls of Rain, Hail or Snow, Thunder and Lightning, etc., should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction.

Budding, Leafing, and *Flowering of Trees.*—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of leafing and flowering. *Individual* Trees or Shrubs of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same plant from year to year being noticed.

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, Princes Street, and at Mr Bryson's, 60, Princes Street, Edinburgh.

Electricity.—Fith balls suspended by a linen thread, in connection with a metallic conductor, and under cover, and the degrees of a circle being used to express the degree of repulsion, form a cheap and convenient Electrometer. Excited glass or sealing-wax ascertains the nature of the electricity.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	In Flower.	Leaf Buds first appear.	In Leaf.	Divested of Leaves.
Alder,				
Ash,				
Beech,				
Birch				
Elm,				
Larch,				
Lime,				
Oak,				
Sycamore or Plane,				

CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Barley,				
Bere or Bigg,				
Oats,				
Wheat,				
Beans,				
Pease,				
Potatoes,				
Turnips,				
Rye Grass,				

SHRUBS, ETC.	First in Blossom.
Barberry,	
Bourtree or Elder,	
Broom,	
Hazel,	
Hawthorn,	
Holly,	
Laburnum,	
Lilac,	
Mezereon,	
Mountain Ash or Rowan,	
Red Flowering Currant,	
Rhododendron Ponticum,	
Whin,	

FRUITS.	First in Blossom.	Fruit Ripe generally.
Apple,		
Black Currant,		
Cherry,		
Gean,		
Gooseberry,		
Peach,		
Pear,		
Plum,		
Strawberry,		

MIGRATORY BIRDS.	First Arrival.	Departure.
Cuckoo,		
Curlew,		
House-Swallow,		
Lapwing,		
Plover,		
Sand-Martin,		
Starling,		
Swan,		
Rail or Corn Crake,		
Other Birds, naming them—		

Have the goodness also to state any information you may be able to collect relative to the Crops of Grain, Hay, Potatoes, Turnips, Fruits, etc., whether plentiful, or in perfection; whether any have suffered from blight, disease, etc. Whether Epizootic disease prevails among Cattle; and the Agricultural condition of the district generally.

METEOROLOGICAL RETURNS.

EDINBURGH.

21, *Rutland Street*,

Sec., Meteorological Society,

DR STARK,

To

[redacted]

C M
EDINBURGH
FE 7
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SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Dalkeith Gardens County of Midlothian, in Lat. _____, Long. _____, Height above Sea 183 feet.

Distance from Sea 3 miles. During the MONTH of February 1858.

Days of Week.	Days of Month.	BAROMETER. 9h. A.M. Barometer.	Attached Thermometer.	6h. P.M. Barometer.	Attached Thermometer.	SELF-REGISTERING THERMOMETERS. Protected. Highest in Air.	Lowest in Air.	Exposed. Max. Black bulb in Sun.	Min. Black bulb during Night.	HYGROMETER. 9h. A.M. Dry bulb.	Wet bulb.	6h. P.M. Dry bulb.	Wet bulb.	WIND. 9h. A.M. Direction.	Force	6h. P.M. Direction.	Force	RAIN. Days on which it fell.	Amount.	CLOUD. 1 to 10	SUNSHINE. Hours.	THERMOMETERS. under Ground. 9h. A.M. 3 inches.	12 inches.	22 inches.	Temperature of SPRING or WELL.	Temperature of SEA.	OZONE. 0 to 10	ELECTRICITY.	GENERAL REMARKS, As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	Days of Month.
		inches.	°	inches.	°	°	°	°	°	°	°	°	°					days.	inches.			°	°	°	°	°				
	1	29.64	33	29.70	32	29	24			26	26	26	26	N. W.		N. W.													Passing clouds. Snow AM Cold	1
	2	29.58	29	29.56	29	29	20			21	20	22	21	N. W.		S. E.													Fine and clear AM Passing clouds	2
	3	29.43	33	29.04	38	46	20			33	33	44	42	S. E.		S. W.													Cloudy and windy. Sleet & Rain at night	3
	4	29.92	49	29.15	40	43	33			34	35	40	38	S. W.		S. W.													Cloudy and windy AM Showers &	4
	5	29.41	40	29.49	43	50	34			43	41	49	45	S. W.		S. W.													Slight Showers AM Clouds throughout	5
	6	29.58	45	29.61	43	52	45			46	46	48	46	S. W.		S.													Densely clouded AM heavy Rain	6
	7	29.72	49	29.75	44	46	39			43	39	41	39	S.		S. E.													Exceedingly fine AM Cloudy PM fine	7
	8	29.88	39	29.80	39	39	32			34	32	35	34	E.		S. E.													Fine dry clear throughout	8
	9	29.89	38	29.91	39	40	31			34	32	38	36	S. E.		S. E.													Cloudy and windy throughout	9
	10	30.02	39	30.09	39	41	33			37	34	37	35	S. E.		S.													Passing clouds throughout	10
	11	29.92	40	29.89	41	44	34			40	34	38	37	S. E.		N. E.													Overcast AM Hazy clouds PM passing	11
	12	30.05	34	30.09	38	40	26			28	27	34	34	E.		N. E.													Exceedingly fine AM Partially Overcast,	12
	13	30.10	36	30.04	38	39	29			36	33	36	35	E.		N. W.													Hazy throughout the day	13
	14	29.99	37	29.26	29	43	29			36	34	34	33	N.		N. E.													Fine and pleasant throughout	14
	15	29.90	32	29.82	38	40	22			27	26	36	35	N. E.		W.													Do Do Do	15
	16	29.80	37	29.83	40	43	34			36	35	37	36	N. W.		W.													Densely clouded AM Passing clouds in	16
	17	29.77	36	29.98	34	41	27			31	30	32	32	W.		S. W.													Exceedingly fine throughout	17
	18	29.99	33	29.97	36	38	26			28	27	30	30	S.		S. E.													Fine clear Day AM Passing clouds PM	18
	19	29.96	33	29.80	34	39	16			24	23	33	30	S.		S. E.													Passing clouds throughout	19
	20	29.84	32	29.70	35	40	24			27	26	35	33	S. E.		S. E.													Slight haze AM Partially	20
	21	29.68	33	29.67	35	38	26			33	33	36	32	S. E.		E.													Cold clouds and Drizzly	21
	22	29.72	35	29.79	34	41	31			35	32	36	34	E.		S. E.													Passing clouds AM Cold and Drizzly	22
	23	29.81	34	29.90	36	40	33			38	34	39	37	S. E.		E.													Densely clouded AM Sleet and Snow	23
	24	29.98	39	30.14	40	43	34			38	36	38	35	E.		S. E.													Passing clouds with fine intervals AM Rain	24
	25	30.30	36	30.34	36	40	26			30	28	33	31	S. E.		E.													Fine clear day throughout	25
	26	30.29	35	30.14	36	40	27			29	28	38	36	N. W.		S. E.													Do Do Do Do	26
	27	30.05	36	29.97	38	43	28			34	33	37	37	S. E.		N. E.													Cloudy with fine intervals AM Shower	27
	28	29.98	39	29.80	41	39	30			36	34	36	34	N. E.		S. E.													Passing clouds AM Snow	28
	29																													29
	30																													30
	31																	2.2												31
Sums.		23[13] 5[12]		22[16] 30[13]		25[10]	25[12] 7			111	100	12 52		15 180		12 132		2.2												
		745.18	1034	825.30	1051	1145	814			940	902	1020	972																	
Means.		29.926		29.796		40.9				33.5	31.8	36.4	34.7					Inches Rain												
		~~30.10~~	36.26	~~29.497~~	37.15	~~41.35~~	29.14			~~33.16~~	~~33.16~~	~~36.12~~	~~34.20~~																	
Index Errors.																														
Correction for Diurnal Range.‡																														
Corrected Means.																														
No. of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		

Barometer, mean corrected reading of Column No. 1 (A.M.),..... = 29.826
Diameter of tube _____ inch; correction for capillarity to be added,..... + 060
Sum,..... 29.886
Correction for Temperature from Column No. 2 to be deducted,..... = − 012
Sum,..... 29.874

Column No. 3 (P.M.),..... = 29.796
Capillarity,..... = + 060
Sum,..... 29.856
Temp. from Col. 4,..... = − 012
Sum,..... 29.844

Mean of the above 29.859
Correction for Height above Sea-level, _____ feet, to add,..... 210
Barometer corrected and reduced to 32° and Sea-level, ... 30.069

Barometer, Highest observed reading of Month,..... = 30.37 on the 25th
Lowest do. do.,..... = 28.92 on the 4th
Difference, or Monthly Range,..... = 1.45

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	1	2	5	9	3	3	1	4	0	—
P.M.	0	4	3	11	2	4	2	2	0	2

Dry bulb Thermometer (mean of Cols. 9 and 11),*..... 34.9
Wet bulb Thermometer (mean of Cols. 10 and 12),*..... 33.2
† Dew-point Temperature,..... 30.4
† Elastic Force of Vapour,..... .169 inch
† Weight of Vapour in a Cubic Foot of Air,.....
† Additional Weight required to Saturate a Cubic Foot,.....
† Degree of Humidity (Saturation 100),..... 83.

Highest Reading Self-Registering Thermometer in Air and Protected,..... 52 on the 6th
Lowest do. do. do.,..... 16 on the 19th
Difference, being Monthly Range,..... 36
Mean of Self-Registering Thermometers in Air and Protected,..... 40.0
Mean Daily Range in Air and Protected,..... 11.8
Greatest Daily Range, do.,.....
Highest Reading Self-Registering Black Bulb Thermometer in Sun,..... on the _____
Lowest do. do. from Radiation during Night, _____ on the _____

(Signed) Wm Thomson
(Designation) Gardener

* If the readings are taken at 9h. and 3h., the 9h. readings to be alone taken to account, as the correction for Diurnal Range in Scotland is unknown.
† All these calculated from Glaisher's Hygrometric Tables, Second Edition *only*.
‡ The Diurnal Range for Scotland is as yet unknown.

N.B.—This Schedule should be returned (post-paid) as early as possible after the completion of the Month, with the Sums correctly added, and the Means deduced. No Wax or Wafers ever to be employed in closing the Schedule—the Gummed Corner to be alone used.

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

Those persons who kindly furnish Monthly Tables of the Weather to the Scottish Meteorological Society are requested to attend to the following Instructions, seeing that one of the most important ends of Meteorological Observations is their being comparable with one another; and that this be attended to as far as circumstances allow, in a like manner, and have their instruments placed, in so far as convenient hour; but should this be impossible, observe at a like hour and the above rule, that the evening and morning readings be taken at the same hour, and this hour entered on the Schedule.

Hour of Observation.—All instruments which are observed twice a-day should be read at the same hour morning and evening, in order to furnish mean results. The Society recommends *a quarter before nine o'clock, morning and evening*, as the most convenient hour; but should this be impossible, observe at a like hour and the above rule, that the evening and morning readings be taken at the same hour, and this hour entered on the Schedule.

Barometer.—Barometers of Messrs Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined, in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will strike against the upper end of the tube with a sharp tap. The mercury should then completely fill the tube. If any air be found in the tube, it should be driven into the cistern by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

The Barometer should be hung in a good light, and perfectly perpendicular, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading, to prevent adhesion of the mercury to the tube. In reading, the eye ought to be placed on the exact level of the top of the column of mercury. The reading of the attached Thermometer ought always to be the first taken, as the heat of the body of the person, are apt to influence its readings.

The corrections necessary to be applied to the Barometric readings depend on the form of the instrument. Howard nomenclature of clouds. The scale of cloud in the these corrections, and the tables employed for the purpose, will be found in the "Report of the Committee of the Royal Society on Physics and Meteorology," 1840, price 1s. The daily readings of the Barometer ought to be entered on the Schedule *as read off*, and the corrections only applied to the mean for the month.

Self-Registering Thermometers and Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and at a like distance, as near as may be *four feet* from the general surface of the ground. Different contrivances are used for this purpose, either a double ventilated box with louvre-boarded sides, fixed at a north window, and projecting 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in an exposed ventilated box with louvre-boarded sides, fixed in an exposed place, and if possible over grass. Whatever means are finally decided on, the position of the instruments should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

The *Self-Registering Thermometers* should be placed in a horizontal. In the case of the ordinary *maximum* Thermometer, with clay, glass, or steel index, the bulb must be slightly depressed, elevated, in order that the mercurial column may be aided by the force of gravity in pushing index; and in the case of the *minimum*. The top of the tube, and also that any part raised in vapour may return to the column. These Thermometers, if read once a-day, should *always be read on the evenings*, so that the time at which the by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the *head of the column* of mercury or of spirit.

The *maximum* Registering Thermometer, for taking the extreme heat of the sun's rays, should have its bulb blackened and the surface rendered dull, and it should be mounted in a blackened box, whose sides should be so high as to protect the bulb from wind. It should be so placed that the sun's rays have free access to it during the heat of the day.

The *minimum* Registering Thermometer, for ascertaining the lowest temperature during the night from radiation, should have its bulb similarly blackened and rendered dull, and be similarly mounted. It should be laid out, about sunset, over grass, in a place freely exposed to the sky, but raised on wooden supports a few inches above the surface, and removed during the day.

Hygrometer.—The *wet* bulb requires the most attention, as it will be often changed. In towns once a month, or oftener, if the weather is dusty, and the muslin gets foul. The bulb should be whenever the muslin seems to be foul. The cotton wick which conducts covered with thin tissue or blotting paper before being attached, in order that the muslin should always be thoroughly wetted, and freed from starch, before being used; and the cotton wick which conducts moisture to it should be previously soaked in a solution of washing soda, and then in pure water, before being attached, in order that it may be thoroughly wetted, else it will conduct the moisture imperfectly, and yield false results. In frosty weather, water must be poured over the wet bulb, so as to form a thin film of ice on the muslin, the evaporation from the ice going on as from the simply wetted bulb.

Rain Gauge.—As "Fleming's Rain Gauges" seem to possess several advantages over others, the Society gives the preference to them; but whatever form be employed, in order that all the stations may yield comparable results, it is recommended that the Gauge be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of *close cut grass*, in a place as distant as possible from trees, houses, high walls, and irregular or broken ground, and the quantity of Rain should, if possible, be registered daily. When more than one Rain Gauge is kept, they ought to be placed near each other, but at different heights above the ground, and their indications noted in the *general remarks*, mentioning their height above ground—the regular column in the Schedule being reserved for the ground Rain Gauge alone.

Winds.—Isolated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately over head, that is, in or near the zenith of the observer. The motion of the higher strata of clouds gives no such indication. Failing the clouds, the general direction of the smoke of a hamlet or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. For mode of estimating the force of the wind, see "Directions for Reading Instruments;" but in all cases it is better to make use of Lind's Anemometer, as procured at Messrs Adie and Son's, and enter the greatest force of the wind during the period of observation.

Clouds.—The Society recommends observers to adopt the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, *so long as it is above the horizon*, is thought by some eminent astronomers to have a powerful effect in dispelling clouds, it would be well to note in the General Remarks any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

Sunshine.—The number of hours the sun shines during the day should be entered in the proper column.

Thermometers under Ground.—Though the temperature and hygrometric conditions of the air are those which chiefly influence the growth of crops, it is important for the health of the crop, and for the germination of the seed, that the soil itself should have a certain temperature. To collect facts which may illustrate this, it is recommended to have Thermometers sunk 3, 12, and 22 inches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil; and the observer should enter in the Schedule the *kind* of soil; whether drained or undrained; and whether naturally wet or dry.

Temperature of the Sea.—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river water, and as near as may be about the time of high water. A Thermometer, with its bulb fixed in a small tin pitcher, covered with a sloping lid, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. Convenient instruments are furnished by Messrs Adie and Son.

Temperature of Springs.—The temperature of Springs or Deep Wells is recommended to be taken whenever practicable, mentioning whether Spring or Well, and its depth from the surface.

Meteors, Aurora Borealis, Remarkable Depression or Elevation of Barometer, Remarkable Falls of Rain, Hail or *Snow, Thunder and Lightning*, etc., should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction.

Budding, Leafing, and *Flowering of Trees.*—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of leafing and flowering. *Individual* Trees or Shrubs of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same plant from year to year being noticed.

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, Princes Street, and at Mr Bryson's, 60, Princes Street, Edinburgh.

Electricity.—Pith balls suspended by a linen thread, in connection with a metallic conductor, and under cover, and the degrees of a circle being used to express the degree of repulsion, form a cheap and convenient Electrometer. Excited glass or sealing-wax ascertains the nature of the electricity.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	In Flower.	Leaf Buds first appear.	In Leaf.	Divested of Leaves.
Alder,				
Ash,				
Beech,				
Birch,				
Elm,				
Larch,				
Lime,				
Oak,				
Sycamore or Plane,				

CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Barley,				
Bere or Bigg,				
Oats,				
Wheat,				
Beans,				
Pease,				
Potatoes,				
Turnips,				
Rye Grass,				

SHRUBS, ETC.	First in Blossom.
Barberry,	
Bourtree or Elder,	
Broom,	
Hazel,	
Hawthorn,	
Holly,	
Laburnum,	
Lilac,	
Mezereon,	
Mountain Ash or Rowan,	
Red Flowering Currant,	
Rhododendron Ponticum,	
Whin,	

FRUITS.	First in Blossom.	Fruit Ripe generally.
Apple,		
Black Currant,		
Cherry,		
Gean,		
Gooseberry,		
Peach,		
Pear,		
Plum,		
Strawberry,		

MIGRATORY BIRDS.	First Arrival.	Departure.
Cuckoo,		
Curlew,		
House-Swallow,		
Lapwing,		
Plover,		
Sand-Martin,		
Starling,		
Swan,		
Rail or Corn Crake,		
Other Birds, naming them—		

Have the goodness also to state any information you may be able to collect relative to the Crops of Grain, Hay, Potatoes, Turnips, Fruits, etc., whether plentiful, or in perfection; whether any have suffered from blight, disease, etc. Whether Epizootic disease prevails among Cattle; and the Agricultural condition of the district generally.

METEOROLOGICAL RETURNS.

EDINBURGH.

21, Rutland Street,

Sec., Meteorological Society,

DR STARK,

To

26

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Dalkeith Gardens County of Midlothian, in Lat. ____, Long. ____, Height above Sea 183 feet.

Distance from Sea 3 miles. During the MONTH of March 1858.

Days of Week.	Days of Month.	BAROMETER. 9 h. A.M. Barometer.	BAROMETER. 9 h. A.M. Attached Thermometer.	BAROMETER. 9 h. P.M. Barometer.	BAROMETER. 9 h. P.M. Attached Thermometer.	SELF-REGISTERING THERMOMETERS. Protected. Highest in Air.	Protected. Lowest in Air.	Exposed. Max. Black bulb in Sun.	Exposed. Min. Black bulb during Night.	HYGROMETER. 9 h. A.M. Dry bulb.	9 h. A.M. Wet bulb.	6 h. P.M. Dry bulb.	6 h. P.M. Wet bulb.	WIND. 9 h. A.M. Direction.	9 h. A.M. Force	6 h. P.M. Direction.	6 h. P.M. Force	RAIN. Days on which it fell.	RAIN. Amount.	CLOUD. 1 to 10	SUNSHINE. Hours.	THERMOMETERS. under Ground. ___ h. A.M. 3 inches.	12 inches.	22 inches.	Temperature of SPRING or WELL.	Temperature of SEA.	OZONE. 0 to 10	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	Days of Month.
		inches.	°	inches.	°	°	°	°	°	°	°	°	°					days.	inches.			°	°	°	°	°				
	1	29.83	38	29.80	37	35	29			31	30	32	29	S.E.		E.													Snow falling throughout the day	1
	2	29.91	36	29.94	36	36	28			33	32	35	34	E.		N.E.													Do Do Do Do	2
	3	29.89	37	29.90	39	40	33			38	37	34	33	N.E.		N.E.													Passing clouds with Showers of Sleet	3
	4	29.70	35	29.49	37	36	30			32	31	33	32	W.		N.W.													Densely clouded a.m. Snow fall p.m.	4
	5	29.60	32	29.25	36	38	28			32	32	36	33	W.		W.W.													Cloudy with fine intervals a.m. Overcast p.m.	5
	6	28.90	36	28.91	36	35	28			31	30	31	30	N.W.		N.W.													Cold and cloudy a.m. Cold and windy	6
28 X	7	28.89	35	28.80	34	35	25			31	31	29	29	N.W.		N.W.													Passing clouds with fine intervals a.m. Snow	7
	8	28.98	32	29.09	32	32	16			25	25	30	29	W.		S.W.													Bright Sun Shine a.m. Cold cutting winds	8
	9	29.14	32	29.30	36	40	25			32	32	36	32	N.W.		N.W.													Chiefly fine throughout the day	9
	10	29.59	34	29.69	35	37	28			32	31	35	34	W.		S.W.													Do Do Do Do Do	10
	11	29.73	33	29.89	34	36	20			27	26	32	31	S.W.		W.													Cold and cloudy throughout	11
29	12	29.84	34	29.59	37	39	27			33	32	34	36	S.W.		S.W.													Densely clouded a.m. Passing Do Sleet	12
	13	29.89	40	29.87	44	51	35			45	44	42	45	W.		W.													Do Do Do Fine at intervals	13
	14	29.70	41	29.40	43	47	36			43	39	44	41	W.		N.W.													Cloudy with fine intervals a.m. Overcast	14
	15	29.51	41	29.62	45	49	36			48	40	46	45	S.W.		S.W.													Particular overcast a.m. Densely Do	15
	16	29.59	46	29.71	47	51	43			46	43	45	41	W.		N.W.													Cloudy with bright intervals a.m. Cold & fine	16
	17	29.94	44	29.91	48	48	36			46	46	48	46	W.		W.													Densely clouded a.m. Cloudy with fine	17
	18	29.85	48	29.90	49	55	43			49	46	49	47	W.		W.													Chiefly fine throughout	18
	19	30.06	49	30.10	51	56	45			49	46	52	48	W.		W.													Densely Clouded a.m. Cloudy with fine intervals	19
	20	30.12	48	30.21	51	56	40			49	45	45	46	S.W.		S.W.													Passing clouds throughout	20
	21	30.29	47	30.31	50	60	34			50	47	49	46	W.		W.													Exceedingly fine throughout	21
	22	30.36	50	30.38	54	64	42			49	47	53	50	S.W.		S.W.													Fine and Mild for the season	22
	23	30.30	50	30.19	53	60	40			51	47	50	49	S.W.		S.W.													Exceedingly fine throughout	23
	24	30.02	49	29.95	51	51	41			50	47	46	46	S.W.		W.													Passing clouds a.m. Sneeloe rain p.m.	24
	25	30.11	46	30.09	48	47	36			36	36	37	35	W.		S.W.													Passing clouds with fine intervals throughout	25
	26	30.12	43	29.93	44	46	31			34	31	45	42	S.W.		N.W.													Overcast a.m. Cloudy throughout p.m.	26
	27	29.93	44	29.98	49	54	34			42	40	46	43	W.		W.													Passing clouds a.m. Densely Do p.m.	27
	28	29.89	48	29.79	51	56	41			52	48	50	48	S.W.		S.W.													Fine and pleasant a.m. Densely clouded	28
	29	29.65	49	29.51	51	54	46			49	46	48	45	S.		S.													Densely clouded a.m. Passing Do p.m.	29
	30	29.38	52	29.25	53	57	44			54	49	52	49	S.W.		S.W.													Do Do Do Dark clouds preceding	30
	31	29.01	51	29.08	46	58	33			40	40	34	36	S.E.		N.E.													Constant Sleet throughout	31
	Sums.	917 15 861		917 17 13			209 15		123 13	19 12	266 12	41 12	297 14																	
		~~[illegible]~~	1202	910.83	1352	1405	1164			1214	1206	1282	1227																	
	Means.	29.731		29.709		46.7	37.9			40.6	38.6	41.3	39.6																	
		~~[illegible]~~	41.11	29.39	43.14	~~[illegible]~~	~~[illegible]~~			~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~																	
	Index Errors.																													
	Correction for Diurnal Range.‡																													
	Corrected Means.																													
	No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		

Rain gage out of Repair

Barometer, mean corrected reading of Column No. 1 (A.M.),..... = 29.731
Diameter of tube ____ inch; correction for capillarity to be added,..... + 060
Sum,..... 29.791
Correction for Temperature from Column No. 2 to be deducted,..... = − 030
Sum,..... 29.761

Column No. 3 (P.M.),..... = 29.709
Capillarity,..... = + 60
Sum..... 29.769
Temp. from Col. 4,..... = − 036
Sum,..... 29.733

Mean of the above 29.747
Correction for Height above Sea-level, ____ feet, to add,..... 210
Barometer corrected and reduced to 32° and Sea-level, ... 29.957

Barometer, Highest observed reading of Month,..... = 30.38 on the 22nd
Lowest do. do.,..... = 28.80 on the 7th
Difference, or Monthly Range,..... = 1.58

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	0	1	1	2	1	10	13	3	0	—
P.M.	0	3	1	0	1	10	8	7	0	—

Dry bulb Thermometer (mean of Cols. 9 and 11),* 40.9
Wet bulb Thermometer (mean of Cols. 10 and 12),* 39.1
† Dew-point Temperature,..... 36.8
† Elastic Force of Vapour,.....
† Weight of Vapour in a Cubic Foot of Air,.....
† Additional Weight required to Saturate a Cubic Foot,.....
† Degree of Humidity (Saturation 100),.....

Reading Self-Registering Thermometer in Air and Protected, ... 64° on the 22nd
do. do. do., ... 16° on the 8th
...ce, being Monthly Range,..... 48°
...f Self-Registering Thermometers in Air and Protected, ... 40.3
...Daily Range in Air and Protected, ... 12.8
...st Daily Range, do., ...
...t Reading Self-Registering Black Bulb Thermometer in Sun, ... on the
Lowest do. do. from Radiation during Night, ... on the

(Signed) Jas Thomson
(Designation) Gardener

* If the readings are taken at 9h and 3h, the 9h readings to be alone taken to account, as the correction for Diurnal Range in Scotland is unknown.
† All these calculated from Glaisher's Hygrometric Tables, Second Edition *only*.
‡ The Diurnal Range for Scotland is as yet unknown.

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Hour of Observation.—All instruments which are observed twice a-day, should be read at the same hour morning and evening, in order to furnish mean results. The Society recommends *a quarter before nine o'clock, morning and evening*, as the most convenient hour; but should this be inconvenient for the observer, another hour may be chosen, attending, however, to the above rule, that the evening and morning readings be taken at the same hour, and this hour entered on the Schedule.

Barometer.—Barometers of Messrs Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined, in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will strike against the upper end of the tube with a sharp tap. The mercury should then completely fill the tube. If any air has got admittance, it should be driven into the cistern by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

The Barometer should be hung in a good light, and perfectly perpendicular, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading, to prevent adhesion of the mercury to the tube. In reading, the eye ought to be placed on the exact level of the top of the column of mercury. The reading of the attached Thermometer ought always to be the first taken, as the heat of the breath, or the proximity of the person, are apt to influence its readings.

The corrections necessary to be applied to the Barometric readings depend on the form of the instrument. The mode of making these corrections, and the tables employed for the purpose, will be found in the "Report of the Committee of the Royal Society on Physics and Meteorology," 1840, price 1s. The daily readings of the Barometer ought to be entered on the Schedule *as read off*, and the corrections only applied to the mean for the month.

Self-Registering Thermometers and Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as near as may be *four feet* from the general surface of the ground. Different contrivances are used for this purpose, either a double ventilated box with louvre-boarded sides, fixed at a north window, and projecting 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in a double meat-safe ventilated box with louvre-boarded sides, fixed in an exposed place, and if possible over grass. Whatever means are finally decided on, the position of the instruments should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

The Self-Registering Thermometers should be placed exactly horizontal. In the case of the ordinary *maximum* Thermometer, with clay, glass, or steel index, the bulb may be *very slightly* elevated, in order that the mercurial column may be somewhat aided by the force of gravity in pushing forward the float or index; and in the case of the *minimum* Thermometer, the bulb must be slightly depressed, to prevent a draining of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These Thermometers, if read once a-day, should *always be read on the evenings*, so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the *head of the column* of mercury or of spirit.

The *maximum* Registering Thermometer, for taking the extreme heat of the sun's rays, should have its bulb blackened and the surface rendered dull, and it should be mounted in a blackened box, whose sides should be so high as to protect the bulb from wind. It should be so placed that the sun's rays have free access to it during the heat of the day.

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Hygrometer.—The *wet* bulb requires the muslin covering it to be often changed. In towns once a month, or oftener, if the weather is dusty, and the muslin gets foul; in the country whenever the muslin seems to be foul. The bulb should be covered with thin tissue or blotting paper below the muslin, and the muslin should always be thoroughly wetted, and freed from starch, before being used; and the cotton wick which conducts moisture to it should be previously soaked in a solution of washing soda, and then in pure water, before being attached, in order that it may be thoroughly wetted, else it will conduct the moisture imperfectly, and yield false results. In frosty weather, water must be poured over the wet bulb, so as to form a thin film of ice on the muslin, the evaporation from the ice going on as from the simply wetted bulb.

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Meteors, Aurora Borealis, Remarkable Depression or Elevation of Barometer, Remarkable Falls of Rain, Hail or *Snow, Thunder* and *Lightning*, etc., should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction.

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Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, Princes Street, and at Mr Bryson's, 60, Princes Street, Edinburgh.

Electricity.—Pith balls suspended by a linen thread, in connection with a metallic conductor, and under cover, and the degrees of a circle being used to express the degree of repulsion, form a cheap and convenient Electrometer. Excited glass or sealing-wax ascertains the nature of the electricity.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	In Flower.	Leaf Buds first appear.	In Leaf.	Divested of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,					Barley,				
Ash,					Bere or Bigg,				
Beech,					Oats,				
Birch,					Wheat,				
Elm,					Beans,				
Larch,					Pease,				
Lime,					Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,					Rye Grass,				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	First Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,		Strawberry,			Rail or Corn Crake,		
Mountain Ash or Rowan,					Other Birds, naming them—		
Red Flowering Currant,							
Rhododendron Ponticum,							
Whin,							

Have the goodness also to state any information you may be able to collect relative to the Crops of Grain, Hay, Potatoes, Turnips, Fruits, etc., whether plentiful, or in perfection; whether any have suffered from blight, disease, etc. Whether Epizootic disease prevails among Cattle; and the Agricultural condition of the district generally.

To

DR STARK,

Sec., Meteorological Society,

21, Rutland Street,

EDINBURGH.

[redacted]

Dalkeith

Jebury & Mauls

METEOROLOGICAL RETURNS.

S X EDINBURGH MY 5 58

DALKEITH MY 4 1858

28

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Dalkeith Gardens County of Midlothian, in Lat. ______, Long. ______, Height above Sea 183 feet.

Distance from Sea 3 miles. During the MONTH of April 185 8.

Days of Week	Days of Month	Barometer 9h A.M. (inches)	Attached Thermometer °	Barometer 6h P.M. (inches)	Attached Thermometer °	Self-Registering Thermometers, Protected: Highest in Air °	Lowest in Air °	Exposed: Max. Black bulb in Sun °	Min. Black bulb during Night °	Hygrometer 9h A.M. Dry bulb °	Wet bulb °	Hygrometer 6h P.M. Dry bulb °	Wet bulb °	Wind 9h A.M. Direction	Force	Wind 6h P.M. Direction	Force	Rain: Days on which it fell	Amount (inches)	Cloud 1 to 10	Sunshine Hours	Thermometers under Ground __h A.M. 3 inches °	12 inches °	22 inches °	Temperature of Spring or Well °	Temperature of Sea °	Ozone 0 to 10	Electricity °	General Remarks, As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	Days of Month
	1	29.59	41	29.58	42	38	30			34	33	37	38	N.		N.W													Densely clouded early a.m. Clear after throughout	1
	2	29.60	40	29.48	43	46	31			38	35	39	36	S.		S.E													Do Do Do Fine and pleasant	2
	3	29.35	41	29.35	41	41	31			36	36	37	37	N.E		W.													Snowfalls a.m. Drizzly throughout p.m.	3
	4	29.87	39	30-02	42	47	30			38	35	41	39	N.W		E.													Passing clouds throughout	4
	5	29.99	39	29.59	43	46	29			39	36	41	38	N.		E.													Passing clouds a.m. Densely do p.m.	5
	6	29.84	42	29.80	43	44	35			40	37	39	36	E.		E.													Densely clouded a.m. Passing do p.m.	6
	7	29.69	41	29.60	41	38	32			39	37	37	35	E.		S.E													Cloudy and windy a.m. Sleet throughout	7
	8	29.5?	37	29.69	44	43	38			39	33	40	37	E.		E.													Densely clouded with winds a.m. Passing clouds	8
	9	29.83	40	29.84	44	43	34			40	36	41	37	E.		E.													Passing clouds with cold winds all day	9
	10	29.86	43	29.78	46	47	29			39	36	40	36	S.E		~~E.~~ S.													Exceedingly fine throughout	10
	11	29.80	42	29.81	44	45	32			36	32	39	34	E.		N.E													Densely clouded a.m. Passing do p.m.	11
	12	29.79	40	29.71	41	44	29			37	34	38	34	N.E		W.													Dark heavy clouds passing throughout	12
	13	29.80	37	29.84	41	43	23			44	40	46	44	N.		E.													Bright sun shine with cold winds	13
	14	29.78	40	29.71	44	46	30			55	50	54	51	S.W		S.W													Windy and cloudy a.m. constant rain	14
	15	29.52	47	29.53	53	60	44			50	46	50	48	W.		N.W													Overcast and windy a.m. Passing clouds	15
	16	29.75	50	29.81	53	56	42			48	45	51	48	S.W		W.													Exceedingly fine throughout	16
	17	29.85	48	29.89	55	60	33			56	50	52	49	S.W		S.W													Greyish white clouds passing throughout	17
	18	29.95	42	29.98	56	61	42			51	47	53	50	S.W		S.W													Fine and seasonable throughout	18
	19	29.96	51	29.90	56	63	39			56	50	55	52	W.		W.													Do Do Do Do Do Do	19
	20	29.88	53	29.92	57	61	38			57	54	59	56	W.		N.W													Fine early a.m. overcast. Fine afternoon	20
	21	30-03	51	30-11	59	63	44			59	55	58	55	N.E		N.W													Overcast a.m. Passing clouds but fine	21
	22	30-20	57	30-19	61	65	46			60	55	59	56	W.		S.W													Exceedingly fine throughout	22
	23	29.19	57	30-00	65	72	42			52	50	50	45	S.W		W.													Excessively hot for the season	23
	24	29.58	57	29-79	58	66	38			50	48	51	49	N.W		N.E													Cloudy but fine a.m. Passing showers	24
	25	30-01	54	29.85	57	58	37			51	48	50	48	N		N.W													Fine pleasant day. Rain at night	25
	26	29-59	53	29.97	58	56	37			50	48	56	54	N.W		N.E													Fine. Slight haze bright sun Foggy at night	26
	27	29.96	54	29-91	57	59	41			59	55	60	55	N.		N.W													Exceedingly fine throughout	27
	28	29.89	54	29.77	59	66	42			51	49	50	40	W.		N.W													Thick haze a.m. Heavy ones Clouds	28
	29	29.41	52	29-02	55	58	41			53	51	49	47	W.		S.W													Densely clouded fine. Passing showers p.m.	29
	30	28.79	52	28.76	55	56	39			50	47	46	44	N.W		N.													Passing clouds with bright intervals showers of hail	30
	31																													31
Sums.		902.64	1404	903-57	1574	1591	1078			1411	1309	1418	1304					Rain gage out of order												
Means.		29.755 / 30-55	46.24	29.750 / ~~30-07~~	50-14	53.0 / 53-01	36.1 / ~~35.25~~			47.01	43-19	47.08	43-14																	
Index Errors.																														
Correction for Diurnal Range.‡																														
Corrected Means.																														
No. of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		

Barometer, mean corrected reading of Column No. 1 (A.M.), = 29.755 Column No. 3 (P.M.), = 29.750

Diameter of tube ____ inch; correction for capillarity to be added, + 060 Capillarity, = + 060

Sum, 29.815 Sum, 29.810

Correction for Temperature from Column No. 2 to be deducted, = − 041 Temp. from Col. 4, = − 053

Sum, 29.774 1531 Sum, 29.757

Mean of the above [redacted]

Correction for Height above Sea-level, ____ feet, to add, [redacted]

Barometer corrected and reduced to 32° and Sea-level, [redacted]

Dry bulb Thermometer (mean of Cols. 9 and 11),* [redacted]

Wet bulb Thermometer (mean of Cols. 10 and 12),*

† Dew-point Temperature,

† Elastic Force of Vapour,

† Weight of Vapour in a Cubic Foot of Air,

† Additional Weight required to Saturate a Cubic Foot,

† Degree of Humidity (Saturation 100),

Barometer, Highest observed reading of Month, = 30.20 on the 22nd

Lowest do. do., = 28.76 on the 30th

Difference, or Monthly Range, = 1.44

SUMMARY OF THE WINDS.										
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	5	3	5	1	1	6	6	4	0	—
P.M.	3	3	6	2	1	5	3	7	0	—

[redacted]t Reading Self-Registering Thermometer in Air and Protected, 72 on the 23d

do. do. do., 23 on the 13th

[redacted]nce, being Monthly Range, 49

[redacted]of Self-Registering Thermometers in Air and Protected, 44.5

[redacted]Daily Range in Air and Protected, 16.9

[redacted]st Daily Range, do., ______

[redacted]st Reading Self-Registering Black Bulb Thermometer in Sun, ______ on the ______

Lowest do. do. from Radiation during Night, ______ on the ______

* If the readings are taken at 9h. and 3h., the 9h. readings to be alone taken to account, as the correction for Diurnal Range in Scotland is unknown.
† All these calculated from Glaisher's Hygrometric Tables, Second Edition *only*.
‡ The Diurnal Range for Scotland is as yet unknown.

(*Signed*) Wm Thomson

(*Designation*) Gardener

N.B.—This Schedule should be returned (post-paid) as early as possible after the completion of the Month, with the Sums correctly added, and the Means deduced. No Wax or Wafers ever to be employed in closing the Schedule—the Gummed Corner to be alone used.

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

THOSE persons who kindly furnish Monthly Tables of the Weather to the Scottish Meteorological Society are requested to attend to the following Instructions, which point out one of the most important ends of Meteorological Observations at their being comparable with one another; and for this purpose it is requisite that all should, if possible, observe at a like hour, and in a like manner, and have their instruments placed, in so far as circumstances allow, in a like position:

Hour of Observation.—All instruments which are observed twice a-day, should be read at the same hour morning and evening, in order to furnish mean results. The Society recommends *a quarter before nine o'clock morning and evening* as the most convenient hour; but should this be inconvenient for the observer, another hour may be chosen, attending, however, to the above rule, that the evening and morning readings be taken at the same hour, and this hour entered on the Schedule.

Barometer.—Barometers of Messrs Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined, in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will strike against the upper end of the tube with a sharp tap. The mercury should then completely fill the tube. If any air has got admittance, it should be driven into the cistern by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

The Barometer should be hung in a good light, and perfectly perpendicular, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading, to prevent adhesion of the mercury to the tube. In reading, the eye ought to be placed on the exact level of the top of the column of mercury. The reading of the attached Thermometer ought always to be the first taken, as the heat of the body of the person, are apt to influence its readings.

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Meteors, Aurora Borealis, Remarkable Depression or Elevation of Barometer, Remarkable Falls of Rain, Hail or Snow, Thunder and Lightning, etc., should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction.

Budding, Leafing, and *Flowering of Trees.*—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of leafing and flowering. *Individual* Trees or Shrubs of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same plant from year to year being noticed.

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, Princes Street, and at Mr Bryson's, 60, Princes Street, Edinburgh.

Electricity.—Pith balls suspended by a linen thread, in connection with a metallic conductor, and under cover, and the degrees of a circle being used to express the degree of repulsion, form a cheap and convenient Electrometer. Excited glass or sealing-wax ascertains the nature of the electricity.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	In Flower.	Leaf Buds first appear.	In Leaf.	Divested of Leaves.
Alder,				
Ash,				
Beech,				
Birch,				
Elm,				
Larch,				
Lime,				
Oak,				
Sycamore or Plane,				

CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Barley,				
Bere or Bigg,				
Oats,				
Wheat,				
Beans,				
Pease,				
Potatoes,				
Turnips,				
Rye Grass,				

SHRUBS, ETC.	First in Blossom.
Barberry,	
Bourtree or Elder,	
Broom,	
Hazel,	
Hawthorn,	
Holly,	
Laburnum,	
Lilac,	
Mezereon,	
Mountain Ash or Rowan,	
Red Flowering Currant,	
Rhododendron Ponticum,	
Whin,	

FRUITS.	First in Blossom.	Fruit Ripe generally.
Apple,		
Black Currant,		
Cherry,		
Gean,		
Gooseberry,		
Peach,		
Pear,		
Plum,		
Strawberry,		

MIGRATORY BIRDS.	First Arrival.	Departure.
Cuckoo,		
Curlew,		
House-Swallow,		
Lapwing,		
Plover,		
Sand-Martin,		
Starling,		
Swan,		
Rail or Corn Crake,		
Other Birds, naming them—		

Have the goodness also to state any information you may be able to collect relative to the Crops of Grain, Hay, Potatoes, Turnips, Fruits, etc., whether plentiful, or in perfection; whether any have suffered from blight, disease, etc. Whether Epizootic disease prevails among Cattle; and the Agricultural condition of the district generally.

SCOTTISH METEOROLOGICAL SOCIETY.

METEOROLOGICAL RETURNS.

21, *Rutland Street,*

EDINBURGH.

To

DR STARK,

Sec., Meteorological

30

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Coalsnaughton Grange County of Clackmannan, in Lat. ____, Long. ____, Height above Sea 183 feet.

Distance from Sea 3 miles. During the MONTH of March 1858.

Days of Week.	Days of Month.	BAROMETER. 9h. A.M. Barometer.	BAROMETER. 9h. A.M. Attached Thermometer.	BAROMETER. 6h. P.M. Barometer.	BAROMETER. 6h. P.M. Attached Thermometer.	SELF-REGISTERING THERMOMETERS. Protected. Highest in Air.	Protected. Lowest in Air.	Exposed. Max. Black bulb in Sun.	Exposed. Min. Black bulb during Night.	HYGROMETER. 9h. A.M. Dry bulb.	9h. A.M. Wet bulb.	6h. P.M. Dry bulb.	6h. P.M. Wet bulb.	WIND. 9h. A.M. Direction.	9h. A.M. Force.	6h. P.M. Direction.	6h. P.M. Force.	RAIN. Days on which it fell.	RAIN. Amount.	CLOUD. 1 to 10	SUNSHINE. Hours.	THERMOMETERS. under Ground. ___h. A.M. 3 inches.	12 inches.	22 inches.	Temperature of SPRING or WELL.	Temperature of SEA.	OZONE. 0 to 10	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	Days of Month.
		inches.	°	inches.	°	°	°	°	°	°	°	°	°					days	inches.			°	°	°	°	°		°		
	1	28.93	37	29.15	49	50	40			45	46	46	44	N.Ea		N.W													Heavily clouded a.m. Threatening rain	1
	2	29.31	48	29.45	50	49	38			46	43	47	44	N.		N.W													Overcast. Passing clouds. Partially overcast p.m.	2
	3	29.48	48	29.55	51	55	32			44	41	46	48	N.W		N.													Passing clouds with fine intervals throughout	3
	4	29.51	47	29.48	53	59	31			49	45	54	50	N.W		W.													Fine and pleasant a.m. Passing clouds & showers	4
	5	29.72	53	29.95	54	55	45			50	48	51	48	W.		W.													Passing clouds with fine intervals	5
	6	30.13	51	30.15	55	60	35			52	49	53	50	N.W		W.													Passing clouds. Fine chiefly. Fine and pleasant	6
	7	30.22	52	30.25	57	61	35			54	50	57	54	N.W		N.													Fine and pleasant a.m. Heavily clouded	7
	8	30.26	50	30.15	59	64	50			60	55	57	52	N.W		N.W													overcast. Fine heavily overcast p.m.	8
	9	30.11	51	30.05	58	56	46			53	51	55	52	N.Ea		N.Ea													Passing clouds a light shower in forenoon Overcast	9
	10	30.09	55	30.09	61	64	44			53	49	56	48	N.Ea		N.Ea													Fine pleasant day throughout	10
	11	30.01	54	29.90	57	59	35			53	49	58	50	N.		N.Ea													do do do do	11
	12	29.82	51	29.70	56	55	42			53	49	50	48	N.Ea		Ea.													Passing clouds a.m. Heavily do p.m.	12
	13	29.59	44	29.55	50	52	48			49	48	49	47	N.Ea		N.Ea													Rain. Passing clouds. Fine and pleasant	13
	14	29.45	51	29.34	55	57	33			52	49	54	50	N.W		W.													Variable throughout the day	14
	15	29.29	52	29.19	53	56	34			51	50	52	49	N.W		S.Ea													Fine Snah from 11-a.m. till 2 p.m. Passing clouds	15
	16	29.23	53	29.40	56	57	43			52	50	54	53	N.W		W.													Fine Shower from hail 9-11 a.m. till 2 p.m. Passing	16
	17	29.41	54	29.47	59	62	42			55	52	58	55	W.		W.													Cloudy and Shower throughout	17
	18	29.38	55	29.26	58	62	48			60	57	49	47	W.		W.													Cloudy Showery and Squally throughout	18
	19	29.29	54	29.60	57	58	42			57	50	52	51	W.		W.													Passing Showers a.m. Hail Showers p.m. Squally at-	19
	20	29.87	54	29.77	58	56	42			52	50	57	50	N.W		S.Ea													Cloudy and Showery throughout	20
	21	29.39	56	29.39	59	61	48			55	53	56	55	W.		S.W													Heavy and dark clouds passing Occasional Showers	21
	22	29.88	54	29.86	55	58	49			56	52	56	53	S.W		S.W													Partially overcast a.m. Cloudy and Showery	22
	23	29.61	56	29.40	57	56	44			56	55	53	51	S.W		S.W													Cloudy and Showery throughout	23
	24	29.46	55	29.40	57	62	44			52	49	52	50	S.W		W.													Cloudy and Showery a.m. Overcast Small rain	24
	25	29.88	54	30.14	56	61	42			55	52	54	52	W.		W.													Fine Cloudy Partially overcast and Showery	25
	26	30.26	52	29.98	54	58	37			50	48	51	50	N.W		S.													Cloudy and Showery throughout	26
	27	29.50	55	29.46	57	60	49			55	51	52	50	S.W		W.													Cloudy Slight Showers a.m. Passing Clouds	27
	28	29.54	55	29.90	57	59	46			55	52	54	52	W.		W.													Passing clouds with bright intervals a.m. Slight Show	28
	29	29.83	58	29.82	59	62	47			57	55	56	53	W.		W.													heavily overcast Partially do Slight Showers	29
	30	29.81	57	29.84	61	68	50			58	56	63	59	S.W		S.W													Heavily overcast a.m. Cloudy but	30
	31	29.87	60	29.80	64	68	49			67	62	66	63	S.		S.W													Remarkable fine throughout the day	31
	Sums.	15 12 21.15		15 15 21.57		14 278	14 70			12 1055	14 20	14 1149	14 37																	
		904 1/2	164 1/2	905.66	1798	1392	1310			1644	1521	1704	1388																	
	Means.	29.682		29.695		59.0	42.2			53.3	50.6	53.8	51.2																	
		29.84	53.4	29.68	57.9	59.2	42.8			53.1	50.2	53.2	51.2																	
	Index Errors.																													
	Correction for Diurnal Range.‡																													
	Corrected Means.																													
	No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		

Barometer, mean corrected reading of Column No. 1 (A.M.),..... = 29.682 Column No. 3 (P.M.),..... = 29.695 Barometer, Highest observed reading of Month,..... = 30.25 on the 8th 2 26

Diameter of tube ____ inch; correction for capillarity to be added,..... + 060 Capillarity,..... = + 060 Lowest do. do.,..... = 28.93 on the 1st

Sum,..... 29.742 Sum,..... 29.755 Difference, or Monthly Range,..... = 1.32

Correction for Temperature from Column No. 2 to be deducted,..... = − 060 Temp. from Col. 4,..... = − 071

Sum,..... 29.682 Sum,..... 29.684

Mean of the above .....

Correction for Height above Sea-level, ____ feet, to add,.....

Barometer corrected and reduced to 32° and Sea-level, ...

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	2	4	0	1	1	5	8	10	0	
P.M.	2	3	2	2	1	5	13	3	0	

Dry bulb Thermometer (mean of Cols. 9 and 11),*.....

Wet bulb Thermometer (mean of Cols. 10 and 12),*.....

† Dew-point Temperature,.....

† Elastic Force of Vapour,.....

† Weight of Vapour in a Cubic Foot of Air,.....

† Additional Weight required to Saturate a Cubic Foot,.....

† Degree of Humidity (Saturation 100),.....

[redacted]

est Reading Self-Registering Thermometer in Air and Protected, ... 78 on the 31st

st do. do. do., ... 31 on the 2nd

rence, being Monthly Range,..... 47

n of Self-Registering Thermometers in Air and Protected, ... 50.6

n Daily Range in Air and Protected, ... 17.8

test Daily Range, do., ...

hest Reading Self-Registering Black Bulb Thermometer in Sun, ... on the

Lowest do. do. from Radiation during Night, ... on the

* If the readings are taken at 9h and 3h, the 9h readings to be alone taken to account, as the correction for Diurnal Range in Scotland is unknown.

† All these calculated from Glaisher's Hygrometric Tables, Second Edition *only*.

‡ The Diurnal Range for Scotland is as yet unknown.

(Signed) Thos Paxmson

(Designation) Gardener

N.B.—This Schedule should be returned (post-paid) as early as possible after the completion of the Month, with the Sums correctly added, and the Means deduced. No Wax or Wafers ever to be employed in closing the Schedule—the Gummed Corner to be alone used.

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

THOSE persons who kindly furnish Monthly Tables of the Weather to the Scottish Meteorological Society are requested to attend to the following Instructions, seeing that one of the most important ends of Meteorological Observations is their being comparable with one another; and for this purpose it is requisite that all should, if possible, observe at a like hour, and in a like manner, and have their instruments placed in as like circumstances, allow, in a like position:

Hour of Observation.—All instruments which are observed twice a-day, should be read at the same hour morning and evening, in order to furnish mean results. The Society recommends *a quarter before nine o'clock, morning and evening*, as the most convenient hour; but should this be inconvenient for the observer, another hour may be chosen, attending, however, to the above rule, that the evening and morning readings be taken at the same hour, and this hour entered on the Schedule.

Barometer.—Barometers of Messrs Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined, in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will strike against the upper end of the tube with a sharp tap. The mercury should then completely fill the tube. If any air has got admittance, it should be driven into the cistern by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

The Barometer should be hung in a good light, and perfectly perpendicular, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading, to prevent adhesion of the mercury to the tube. In reading, the eye ought to be placed on the exact level of the top of the column of mercury. The reading of the attached Thermometer ought always to be the first taken, as the heat of the breath, or the proximity of the person, are apt to influence its readings.

The corrections necessary to be applied to the Barometric readings depend on the form of the instrument. The mode of making these corrections, and the tables employed for the purpose, will be found in the "Report of the Committee of the Royal Society on Physics and Meteorology," 1840, price 1s. The daily readings of the Barometer ought to be entered on the Schedule *as read off*, and the corrections only applied to the mean for the month. These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as near as may be *four feet* from the general surface of the ground. Different corrections are used for this purpose, either a double ventilated box with louvre-boarded sides, fixed at a north window, and projecting 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in a double meat-safe ventilated box with louvre-boarded sides, fixed in an exposed place, and if possible over grass. Whatever means are finally decided on, the position of the instruments should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

The *Self-Registering Thermometers* should be placed exactly horizontal. In the case of the ordinary *maximum* Thermometer, with clay, glass, or steel index, the bulb may be *very slightly* elevated, in order that the mercurial column may be somewhat aided by the force of gravity in pushing forward the float or index; and in the case of the *minimum* Thermometer, the bulb must be slightly depressed, to prevent a draining of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These Thermometers, if read once a-day, should *always be read on the evenings*, so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the *head of the column* of mercury or of spirit.

The *maximum* Registering Thermometer, for taking the extreme heat of the sun's rays, should have its bulb blackened and the surface rendered dull, and it should be mounted in a blackened box, whose sides should be so high as to protect the bulb from wind. It should be so placed that the sun's rays have free access to it during the heat of the day.

The *minimum* Registering Thermometer, for ascertaining the lowest temperature during the night from radiation, should have its bulb similarly blackened and rendered dull, and be similarly mounted. It should be laid out, about sunset, over grass, in a place freely exposed to the sky, but raised on wooden supports a few inches above the surface, and removed during the day.

Hygrometer.—The *wet* bulb requires the muslin covering it to be often changed. In towns once a month, or oftener, if the weather is dusty, and the muslin gets foul; in the country whenever the muslin seems to be foul. The bulb should be covered with thin tissue or blotting paper below the muslin, and the muslin should always be thoroughly wetted, and freed from starch, before being used; and the cotton wick which conducts moisture to it should be previously soaked in a solution of washing soda, and then in pure water, before being attached, in order that it may be thoroughly wetted, else it will conduct the moisture imperfectly, and yield false results. In frosty weather, water

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	In Flower.	Leaf Buds first appear.	In Leaf.	Divested of Leaves.
Alder,				
Ash,				
Beech,				
Birch				
Elm,				
Larch,				
Lime,				
Oak,				
Sycamore or Plane,				

CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Barley,				
Bere or Bigg,				
Oats,				
Wheat,				
Beans,				
Pease,				
Potatoes,				
Turnips,				
Rye Grass,				

SHRUBS, ETC.	First in Blossom.
Barberry,	
Bourtree or Elder,	
Broom,	
Hazel,	
Hawthorn,	
Holly,	
Laburnum,	
Lilac,	
Mezereon,	
Mountain Ash or Rowan,	
Red Flowering Currant,	
Rhododendron Ponticum,	
Whin,	

FRUITS.	First in Blossom.	Fruit Ripe generally.
Apple,		
Black Currant,		
Cherry,		
Gean,		
Gooseberry,		
Peach,		
Pear,		
Plum,		
Strawberry,		

MIGRATORY BIRDS.	First Arrival.	Departure.
Cuckoo,		
Curlew,		
House-Swallow,		
Lapwing,		
Plover,		
Sand-Martin,		
Starling,		
Swan,		
Rail or Corn Crake,		
Other Birds, naming them—		

Have the goodness also to state any information you may be able to collect relative to the Crops of Grain, Hay, Potatoes, Turnips, Fruits, etc., whether plentiful, or in perfection; whether any have suffered from blight, disease, etc. Whether Epizootic disease prevails among Cattle; and the Agricultural condition of the district generally.

METEOROLOGICAL RETURNS.

EDINBURGH.

21, Rutland Street,

Sec., Meteorolog

DR STARK,

To

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Dalkeith Gardens, County of Midlothian, in Lat. ____, Long. ____, Height above Sea 183 feet.

Distance from Sea 3 miles. During the MONTH of June 1854.

Days of Week.	Days of Month.	BAROMETER. 9 h. A.M. Barometer.	BAROMETER. 9 h. A.M. Attached Thermometer.	BAROMETER. 6 h. P.M. Barometer.	BAROMETER. 6 h. P.M. Attached Thermometer.	SELF-REGISTERING THERMOMETERS. Protected. Highest in Air.	SELF-REGISTERING THERMOMETERS. Protected. Lowest in Air.	SELF-REGISTERING THERMOMETERS. Exposed. Max. Black bulb in Sun.	SELF-REGISTERING THERMOMETERS. Exposed. Min. Black bulb during Night.	HYGROMETER. 9 h. A.M. Dry bulb.	HYGROMETER. 9 h. A.M. Wet bulb.	HYGROMETER. 6 h. P.M. Dry bulb.	HYGROMETER. 6 h. P.M. Wet bulb.	WIND. 9 h. A.M. Direction.	WIND. 9 h. A.M. Force.	WIND. 6 h. P.M. Direction.	WIND. 6 h. P.M. Force.	RAIN. Days on which it fell.	RAIN. Amount.	CLOUD. 1 to 10	SUNSHINE. Hours.	THERMOMETERS. under Ground. ___ h. A.M. 3 inches.	12 inches.	22 inches.	Temperature of SPRING or WELL.	Temperature of SEA.	OZONE. 0 to 10	ELECTRICITY.	GENERAL REMARKS, As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. *Mention the hour at which these began and ended.*	Days of Month.
		inches.	°	inches.	°	°	°	°	°	°	°	°	°					days	inches.			°	°	°	°	°				
	1	29-91	65	30-00	70	73	55			67	64	65	60	S.W.		W.													Partially overcast Thin Veil	1
	2	29-99	64	29-79	67	70	45			62	57	65	62	S.		S.W.													fine and pleasant. Partially overcast	2
	3	29-78	64	29-70	66	69	56			66	63	61	59	S.W.		S.W.													Partially overcast. Heavy & Thunder	3
	4	29-78	65	29-92	68	65	57			63	60	61	56	W.		S.W.													Many Clouds passing Showers	4
	5	29-94	64	29-91	70	71	49			61	57	65	61	S.W.		S.													Passing Clouds but fine Clear Sky	5
	6	29-98	65	29-99	69	70	49			63	60	66	62	W.		S.													fine, Overcast, passing Clouds Exceedingly	6
	7	30-01	65	29-89	71	73	44			60	57	72	64	S.W.		S.W.													Exceedingly fine throughout	7
	8	29-83	68	29-78	68	82	49			67	61	73	67	S.		S.E.													Exceedingly hot, some Wind Partially overcast	8
	9	29-83	69	29-82	72	74	52			64	60	66	62	W.		S.W.													fine, Overcast, Passing Clouds Lightning	9
	10	29-92	67	29-99	71	70	58			65	63	65	62	W.		S.W.													Very fine Mostly overcast, Many Clouds	10
	11	30-02	69	29-93	74	73	54			66	62	69	63	S.W.		W.													fine pleasant day throughout	11
	12	29-86	68	29-75	71	70	58			61	59	67	65	S.W.		S.													Cloudy Passing clouds Rain at	12
	13	29-76	69	29-77	72	71	51			67	64	70	67	W.		W.													Passing Clouds Overcast Passing	13
	14	29-69	69	29-70	68	82	56			70	66	75	69	W.		S.W.													Passing Clouds with fine intervals Thunder	14
	15	29-85	73	29-80	76	81	61			78	74	74	69	S.		S.E.													Cloudy Passing showers Thunder and Rain	15
	16	29-85	73	29-88	74	76	59			69	66	70	68	S.		S.W.													Cloudy Cool Thunder and Rain Passing showers	16
	17	29-68	71	29-66	69	66	56			61	60	65	57	S.		S.W.													Foggy Showers and Thunder and Rain	17
	18	29-75	68	29-90	68	69	50			64	61	68	65	S.		S.E.													English White Clouds passing Showers	18
	19	29-91	67	29-95	70	72	49			67	63	64	62	S.W.		S.W.													Passing Clouds with fine intervals A fine	19
	20	29-99	68	30-05	72	71	50			64	60	68	66	W.		S.E.													do do do do Exceedingly	20
	21	~~29~~ 30-12	68	30-10	73	74	49			62	60	74	70	W.		W.													Exceedingly fine throughout the day	21
	22	30-17	71	30-22	78	75	52			69	66	72	68	W.		W.													Partially overcast Fine Cloudy but	22
	23	30-28	69	30-16	72	70	50			62	59	69	65	W.		S.W.													Passing Clouds throughout the day	23
	24	30-13	67	30-18	69	69	51			62	57	60	56	S.		W.													Most heavy clouds passing through	24
	25	30-12	65	29-97	67	65	50			61	57	63	58	W.		W.													do do do	25
	26	29-77	65	29-78	67	64	54			61	56	60	57	W.		S.W.													Partially overcast A.M. Cloudy but	26
	27	29-80	62	29-92	65	67	45			58	52	62	55	W.		W.													Passing Clouds with fine intervals	27
	28	29-72	62	29-70	64	61	44			56	54	58	56	S.W.		S.W.													Partially overcast Cpitting rain	28
	29	29-91	61	29-90	65	68	48			61	56	61	57	W.		W.													Thinly Clouded throughout	29
	30	29-87	62	29-89	67	64	57			59	55	58	54	S.W.		S.W.													Passing Clouds with fine intervals	30
	31																													31
	Sums.	20 M 2733	202	21 12 2725																										
		876.22	2102	87.645	2093	2122	1536			1918	1811	1973	1856	1856																
	Means.	29.911	67.	29.908																										
		~~29.244~~	70.03	~~29.215~~	69.34	70.23	51.16			63.21	60.11	66.13	61.96	61.96																
	Index Errors.	29																												
	Correction for Diurnal Range.‡																													
	Corrected Means.																													
	No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		

Barometer, mean corrected reading of Column No. 1 (A.M.),..... = 29.911 Column No. 3 (P.M.),..... = 29.908

Diameter of tube ____ inch; correction for capillarity to be added,..... + .060 Capillarity,..... = + .060

Sum,..... 29.971 Sum,..... 29.968

Correction for Temperature from Column No. 2 to be deducted,..... = — .109 Temp. from Col. 4,..... = — .105

Sum,..... 29.862 Sum,..... 29.863

Mean of the above 29.862

Correction for Height above Sea-level, ____ feet, to add,.....

Barometer corrected and reduced to 32° and Sea-level, ...

Barometer, Highest observed reading of Month,..... = 30.28 on the 23d

Lowest do. do.,..... = 29.65 on the 12th

Difference, or Monthly Range,..... = 0.63

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	3	0	0	0	7	8	8	4	0	
P.M.	0	1	0	3	3	14	4	5	0	

Dry bulb Thermometer (mean of Cols. 9 and 11),*.....

Wet bulb Thermometer (mean of Cols. 10 and 12),*.....

† Dew-point Temperature,.....

† Elastic Force of Vapour,.....

† Weight of Vapour in a Cubic Foot of Air,.....

† Additional Weight required to Saturate a Cubic Foot,.....

† Degree of Humidity (Saturation 100),.....

t Reading Self-Registering Thermometer in Air and Protected, ... 82 on the 8d 14h

do. do. do., ... 44 on the 7d 28h

ce, being Monthly Range,..... 38

f Self-Registering Thermometers in Air and Protected, ... 60.6

Daily Range in Air and Protected, ... 19.2

t Daily Range, do., ...

Reading Self-Registering Black Bulb Thermometer in Sun, ... on the

do. do. from Radiation during Night, ... on the

(Signed) Wm Thomson

(Designation) Gardener

* If the readings are taken at 9h. and 3h., the 9h. readings to be alone taken to account, as the unknown.

† All these calculated from Glaisher's Hygrometric Tables, Second Edition *only*.

‡ The Diurnal Range for Scotland is as yet unknown.

N.B.—This Schedule should be returned (post-paid) as early as possible after the compl

leans deduced. No Wax or Wafers ever to be employed in closing the Schedule—the Gummed Corner to be alone used.

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

THOSE persons who kindly furnish Monthly Tables of the Weather to the Scottish Meteorological Society are requested to attend to the following Instructions, seeing that one of the most important ends of Meteorological Observations is their being comparable with one another; and for this purpose it is requisite that all should, if possible, observe at a like hour, and in a like manner, and have their instruments placed, in so far as circumstances allow, in a like position:

Hour of Observation.—All instruments which are observed twice a-day, should be read at the same hour morning and evenings, in order to furnish mean results. The Society recommends *a quarter before nine o'clock, morning and evening*, as the most convenient hour; but should this be inconvenient for the observer, another hour may be chosen, attending, however, to the above rule, that the evening and morning readings be taken at the same hour, and this hour entered on the Schedule.

Barometer.—Barometers of Messrs Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined, in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will strike against the upper end of the tube with a sharp tap. The mercury should then completely fill the tube. If any air has got admittance, it should be driven into the cistern by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

The Barometer should be hung in a good light, and perfectly perpendicular, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading, to prevent adhesion of the mercury to the tube. In reading, the eye ought to be placed on the exact level of the top of the column of mercury. The reading of the attached Thermometer ought always to be the first taken, as the heat of the body of the person, are apt to influence its readings.

The corrections necessary to be applied to the Barometric readings depend on the form of the instrument. Instruments should be mounted, these corrections, and the tables employed for the purpose, will be found in the "Report of the Committee of the Royal Society on Physics and Meteorology," 1840, price 1s. The daily readings of the Barometer ought to be entered on the Schedule *as read off*, and the corrections only applied to the mean for the month.

Self-Registering Thermometers and Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as near as may be *your feet* from the general surface of the ground. Whatever means are used for this purpose, either a north window, and projecting 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in a double meat-safe ventilated box with louvre-boarded sides, all; or in a double meat-safe place, and if possible over grass. Whatever means are finally decided on, the position of the instruments should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

The *Self-Registering Thermometers* should be placed exactly horizontal. In the case of the ordinary *maximum* Thermometer, with clay, glass, or steel index, the bulb elevated, in order that the mercurial column may be somewhat aided by the force of gravity in pushing forward the float or index; and in the case of the *minimum* Thermometer, the bulb must be slightly depressed, to prevent a draining of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These Thermometers, if read once a-day, should *always be read on the evenings*, so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the *head of the column* of mercury or of spirit.

The *maximum* Registering Thermometer, for taking the extreme heat of the sun's rays, should have its bulb blackened and the surface rendered dull, and it should be mounted in a blackened box, whose sides should be so high as to protect the bulb from wind. It should be so placed that the bulb has free access to it during the heat of the day.

The *minimum* Registering Thermometer, for ascertaining the lowest temperature during the night from radiation, should have its bulb similarly blackened and rendered dull, and be similarly mounted. It should be laid out, about sunset, over grass, in a place freely exposed to the sky, but raised on wooden supports a few inches above the surface, and removed during the day.

Hygrometer.—The *wet* bulb requires the muslin covering it to be often changed. In towns once a month, or oftener, if the weather is dusty, and the muslin gets foul. The bulb should be whenever the muslin seems to be foul. The bulb should be covered with thin tissue or blotting paper below the muslin, and freed from the muslin should always be thoroughly wetted, and freed from starch, before being used; and the cotton wick which conducts moisture to it should be previously soaked in a solution of washing soda, and then in pure water, before being attached, in order that it may be thoroughly wetted, else it will conduct the moisture imperfectly, and yield false results. In frosty weather, water must be poured over the wet bulb, so as to form a thin film of ice on the muslin, the evaporation from the ice going on as from the simply wetted bulb.

Rain Gauge.—As "Fleming's Rain Gauges" seem to possess several advantages over others, the Society gives the preference to them; but whatever form be employed, in order that all the stations may yield comparable results, it is recommended that the Gauge be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of *close cut grass*, in a place as distant as possible from trees, houses, high walls, and irregular or broken ground, and the quantity of Rain should, if possible, be registered daily. When more than one Rain Gauge is kept, they ought to be placed near each other, but at different heights above the ground, and their indications noted in the *general remarks*, mentioning their height above ground—the regular column in the Schedule being reserved for the ground Rain Gauge alone.

Winds.—Isolated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately over head, that is, in or near the zenith of the observer. The motion of the higher strata of clouds gives no such indication. Failing the clouds, the general direction of the smoke of a hamlet or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. For mode of estimating the force of the wind, see "Directions for Reading Instruments;" but in all cases it is better to make use of Lind's Anemometer, as procured at Messrs Adie and Son's, and enter the greatest force of the wind during the period of observation.

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, *so long as it is above the horizon*, is thought by some eminent astronomers to have a powerful effect in dispelling clouds, it would be well to note in the General Remarks any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

Sunshine.—The number of hours the sun shines during the day should be entered in the proper column.

Thermometers under Ground.—Though the temperature and hygrometric conditions of the air are those which chiefly influence the growth of crops, it is important for the health of the crop, and for the germination of the seed, that the soil itself should have a certain temperature. To collect facts which may illustrate this, it is recommended to have Thermometers sunk 3, 12, and 22 inches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil; and the observer should enter in the Schedule the *kind* of soil; whether drained or undrained; and whether naturally wet or dry.

Temperature of the Sea.—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river water, and as near as may be about the time of high water. A Thermometer, with its bulb fixed in a small tin pitcher, covered with a sloping lid, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. Convenient instruments are furnished by Messrs Adie and Son.

Temperature of Springs.—The temperature of Springs or Deep Wells is recommended to be taken whenever practicable, mentioning whether Spring or Well, and its depth from the surface.

Meteors, Aurora Borealis, Remarkable Depression or Elevation of Barometer, Remarkable Falls of Rain, Hail or *Snow, Thunder and Lightning*, etc., should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction.

Budding, Leafing, and *Flowering of Trees.*—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of leafing and flowering. *Individual* Trees or Shrubs of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same plant from year to year being noticed.

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, Princes Street, and at Mr Bryson's, 60, Princes Street, Edinburgh.

Electricity.—Pith balls suspended by a linen thread, in connection with a metallic conductor, and under cover, and the degrees of a circle being used to express the degree of repulsion, form a cheap and convenient Electrometer. Excited glass or sealing-wax ascertains the nature of the electricity.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	In Flower.	Leaf Buds first appear.	In Leaf.	Divested of Leaves.
Alder,				
Ash,				
Beech,				
Birch				
Elm,				
Larch,				
Lime,				
Oak,				
Sycamore or Plane,				

CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Barley,				
Bere or Bigg,				
Oats,				
Wheat,				
Beans,				
Pease,				
Potatoes,				
Turnips,				
Rye Grass,				

SHRUBS, ETC.	First in Blossom.
Barberry,	
Bourtree or Elder,	
Broom,	
Hazel,	
Hawthorn,	
Holly,	
Laburnum,	
Lilac,	
Mezereon,	
Mountain Ash or Rowan,	
Red Flowering Currant,	
Rhododendron Ponticum,	
Whin,	

FRUITS.	First in Blossom.	Fruit Ripe generally.
Apple,		
Black Currant,		
Cherry,		
Gean,		
Gooseberry,		
Peach,		
Pear,		
Plum,		
Strawberry,		

MIGRATORY BIRDS.	First Arrival.	Departure.
Cuckoo,		
Curlew,		
House-Swallow,		
Lapwing,		
Plover,		
Sand-Martin,		
Starling,		
Swan,		
Rail or Corn Crake,		
Other Birds, naming them—		

Have the goodness also to state any information you may be able to collect relative to the Crops of Grain, Hay, Potatoes, Turnips, Fruits, etc., whether plentiful, or in perfection; whether any have suffered from blight, disease, etc. Whether Epizootic disease prevails among Cattle; and the Agricultural condition of the district generally.

METEOROLOGICAL RETURNS.

21, *Rutland Street*, EDINBURGH.

Sec., Meteorolog

To

DR STARK,

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Dalkeith Gardens, County of Midlothian, in Lat. ______, Long. ______, Height above Sea 183 feet.

Distance from Sea 3 miles. During the MONTH of July 1859.

Days of Month	Barometer 9h A.M. (inches)	Attached Thermometer 9h A.M.	Barometer 6h P.M. (inches)	Attached Thermometer 6h P.M.	Self-Registering Thermometers, Protected: Highest in Air	Lowest in Air	Hygrometer 9h A.M. Dry bulb	Wet bulb	Hygrometer 6h P.M. Dry bulb	Wet bulb	Wind 9h A.M. Direction	Wind 6h P.M. Direction	General Remarks
1	29.88	62	29.87	67	63	46	59	53	61	57	S.W	S.W	Warm heavy clouds passing throughout
2	29.94	62	30.06	64	61	47	57	53	59	56	S.W	N.W	Densely overcast Passing clouds overcast
3	30.18	60	30.11	65	65	48	55	51	60	56	S.W	W	Passing clouds with fine intervals A.M. Exceedingly fine
4	29.80	61	29.51	62	57	49	54	52	56	55	S.W	S.W	Densely overcast constant rain A.M. Partially dry
5	29.49	60	29.50	65	63	48	59	55	61	58	W	N.W	Showery A.M. Fair but cloudy throughout
6	29.57	61	29.58	62	57	47	54	53	56	54	N.W	N.E	Overcast Drashing showers A.M. Dull some rain
7	29.55	60	29.58	61	61	48	55	54	57	54	N	S.W	Cloudy and showery throughout the day
8	29.15	60	29.77	61	~~64~~	48	56	52	52	51	N.W	N.W	Densely overcast Slight showers A.M. Cloudy
9	29.78	59	29.81	60	60	46	53	52	54	52	S.W	W	Passing clouds with fine intervals throughout
10	29.91	61	29.97	64	64	50	58	53	59	55	N.W	S.W	Sultry A.M. Excessively warm P.M.
11	30.02	64	29.99	69	79	46	60	56	66	64	S.W	S.W	Passing clouds A.M. Densely Do. Small rain
12	29.93	65	29.80	70	71	45	67	63	67	65	W	N.W	Cloudy with fine intervals A.M. Densely Do. Small rain
13	29.60	67	29.51	68	79	52	68	65	65	62	S.W	W	Passing clouds A.M. overcast P.M.
14	29.50	67	29.73	66	76	46	70	64	58	61	S.W	S.W	Densely clouded Small rain A.M. Rain throughout
15	29.81	63	29.76	65	60	50	58	54	61	59	N	N.E	Do Do Do Do Do Do
16	29.72	62	29.86	62	71	52	62	59	61	59	S.W	W	Partially overcast A.M. Very Mild P.M.
17	29.88	62	29.89	66	69	51	59	56	66	63	N	N.W	Fine Thunder at 1/2 past 10 A.M. Cloudy throughout
18	29.81	63	29.89	68	72	54	69	64	68	64	N.W	S.W	Cloudy with fine intervals throughout
19	29.99	64	29.94	71	75	48	68	64	72	68	S.W	S.W	Passing clouds A.M. overcast P.M.
20	29.78	66	29.60	69	69	48	63	58	64	56	W	W	Overcast some rain A.M. Partially Do fair
21	29.57	65	29.60	65	64	53	60	56	63	60	W	S.W	Passing clouds with fine intervals some wind
22	29.61	63	29.65	67	67	50	66	60	64	60	S.W	W	Passing clouds with fine intervals throughout
23	29.64	67	29.63	64	66	48	61	57	62	59	W	N.W	Do Do Do Do Do
24	29.58	63	29.38	66	79	46	70	64	64	60	N.W	N.E	Passing clouds very heavy rain at night
25	29.39	62	29.40	65	66	49	62	60	63	60	W	N.W	Torrents of rain early A.M. Passing clouds windy
26	29.59	61	29.69	65	63	48	60	58	61	58	W	N.W	Passing clouds throughout the day
27	29.70	62	29.71	65	66	46	65	60	62	59	S.W	S	Fine overcast Passing clouds throughout P.M.
28	29.85	63	29.98	66	65	49	64	60	62	60	W	N	Hazy clouds passing throughout the day
29	29.95	61	29.92	65	66	42	61	58	64	62	N.E	N	Do Do Do Do Do
30	29.98	62	29.97	67	69	46	62	58	65	61	N.W	N.W	Passing cloud A.M. overcast P.M.
31	30.04	63	30.09	68	66	47	64	58	65	60	W	—	— — — — —
Sums					223 ~~173~~	253	29	210	62	279			
	921.96	1941	923.55	1908	2012	1872	1884	1830	1938	1829			
Means	29.739		29.774		67.2	48.1	60.9	56.7	62.0	59.00			
	~~29.739~~	62.19	~~29.79~~	61.17	~~64.9~~	48.33	60.24	59.01	62.06	59.00			
Index Errors					67.2								
Correction for Diurnal Range.‡													
Corrected Means													
No. of Column	1	2	3	4	5	6	9	10	11	12	13	15	

Barometer, mean corrected reading of Column No. 1 (A.M.) = 29.739 — Column No. 3 (P.M.) = 29.774

Diameter of tube ______ inch; correction for capillarity to be added, + .060 — Capillarity, = + .060

Sum, 29.799 — Sum, 29.834

Correction for Temperature from Column No. 2 to be deducted, = − .086 — Temp. from Col. 4, = − .083

Sum, 29.713 — 64 Sum, 29.751

Mean of the above ......

Correction for Height above Sea-level, ______ feet, to add, ...

Barometer corrected and reduced to 32° and Sea-level, ...

Barometer, Highest observed reading of Month, = 30.11 on the 3d

Lowest do. do., = 29.15 on the 8th

Difference, or Monthly Range, = 0.96

SUMMARY OF THE WINDS.										
Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	3	1	0	0	0	12	9	6	0	—
P.M.	2	3	0	0	1	9	6	9	0	—

Dry bulb Thermometer (mean of Cols. 9 and 11),* ......

Wet bulb Thermometer (mean of Cols. 10 and 12),* ......

† Dew-point Temperature, ...

† Elastic Force of Vapour, ...

† Weight of Vapour in a Cubic Foot of Air, ...

† Additional Weight required to Saturate a Cubic Foot, ...

† Degree of Humidity (Saturation 100), ...

Reading Self-Registering Thermometer in Air and Protected, ... 79° on the 11th

do. do. do., ... 42° on the 29th

e, being Monthly Range, ... 37°

Self-Registering Thermometers in Air and Protected, ... 57.6

ily Range in Air and Protected, ... ~~17.~~ 19.1

Daily Range, do., ...

Reading Self-Registering Black Bulb Thermometer in Sun, ... on the ______

do. do. from Radiation during Night, ______ on the ______

(Signed) Wm Thomson

(Designation) Gardener

* If the readings are taken at 9h. and 3h., the 9h. readings to be alone taken to account, as the c
unknown.
† All these calculated from Glaisher's Hygrometric Tables, Second Edition *only*.
‡ The Diurnal Range for Scotland is as yet unknown.

N.B.—This Schedule should be returned (post-paid) as early as possible after the comple ... *ans deduced. No Wax or Wafers ever to be employed in closing the Schedule—the Gummed Corner to be alone used.*

...ui Entering of Temp. Reg Therm.

To

DR STARK,

Sec., Meteorologic

21, Rutland Street,

EDINBURGH.

METEOROLOGICAL RETURNS.

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

THOSE persons who kindly furnish Monthly Tables of the Weather to the Scottish Meteorological Society are requested to attend to the following Instructions, the simply wetted bulb.

Rain Gauge.—As "Fleming's Rain Gauges" seem to possess most important ends of Meteorological Observations as their being comparable with one another; and for this purpose it is requisite that all should, if possible, observe at a like height, and in a like manner, and have their instruments placed in so far as circumstances allow, in a like position.

Hour of Observation.—All instruments should be read at the same twice a-day, should be read at the same hour, in order to furnish mean results. The Society recommends *a quarter before nine o'clock morning and evening*, as the most convenient hour; but should this be inconvenient for the observer, another hour may be chosen, attending, however, to the above rule, that the evening and morning readings be taken at the same hour, and this hour entered on the Schedule.

Barometer.—Improvements of Messrs Adie and Son's construction are recommended, but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined, in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will strike against the upper end of the tube with a sharp tap. The mercury should then completely fill the tube. If any air should be driven into the cistern by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

The Barometer should be hung in a good light, and perfectly perpendicular, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading, to prevent adhesion of the mercury to the tube. In reading, the eye ought to be placed on the exact level of the top of the column of mercury. The reading of the attached Thermometer ought always to be the first taken, as the heat of the breath, or the proximity of the person, are apt to influence its readings.

The corrections necessary to be applied to the Barometric readings depend on the form of the instrument. The mode of making these corrections, and the tables employed for the purpose, will be found in the "Report of the Committee of the Royal Society on Physics and Meteorology," 1840, price 1s. The daily readings of the Barometer ought to be entered on the Schedule *as read* off, and the corrections only applied to the mean for the month.

Self-Registering Thermometers and Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and so near as may be *four feet* from the general surface of the ground. Different contrivances are used for this purpose, either a double ventilated box with louvre-boarded sides, fixed at a north window, and projecting 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in a double meat-safe ventilated box with louvre-boarded sides, fixed in an exposed place, and if possible over grass. Whatever means are finally decided on, the position of the instruments should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

The *Self-Registering Thermometers* should be placed exactly horizontal. In the case of the ordinary *maximum* Thermometer, with clay, glass, or steel index, the bulb may be *very slightly* elevated, in order that the mercurial column may be somewhat aided by the force of gravity in pushing forward the float or index; and in the case of the *minimum* Thermometer, the bulb must be slightly depressed, to prevent a drain to the top of the tube, and also that any part raised may return to the column. These Thermometers, if read once a-day, should *always be read on the evenings*, so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the column of mercury or of spirit.

The *maximum* Registering Thermometer for taking the extreme heat of the sun's rays, should have its bulb blackened and the surface rendered dull, and it should be mounted in a blackened box, whose sides should be so high as to protect the bulb from wind. It should be so placed that the sun's rays have free access to it during the heat of the day.

The *minimum* Registering Thermometer, for ascertaining the lowest temperature during the night from radiation, should have its bulb similarly blackened and rendered dull, and be similarly mounted. It should be laid out, about sunset, over grass, in a place freely exposed to the sky, but raised on wooden supports a few inches above the surface, and removed during the day.

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Rain Gauge.—As "Fleming's Rain Gauges" seem to possess several advantages over others, the Society gives the preference to them, but whatever form be employed, in order that all the stations may yield comparable results, it is recommended that the Gauge be sunk in the ground, so that the top of the receiver is as distant as possible from trees, houses, high walls, and irregular or broken ground, and the quantity of Rain should, if possible, be registered daily. When more than one Rain Gauge is kept, they ought to be placed near each other, but at different heights above the ground, and their indications noted in the *general remarks*, mentioning their height above ground—the regular column in the Schedule being reserved for the ground Rain Gauge alone.

Winds.—Isolated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately over head, that is, in or near the zenith of the observer. The motion of the higher strata of clouds gives no such indication. Failing the clouds, the general direction of the smoke of a hamlet or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. For mode of estimating the force of the wind, see "Directions for Reading Instruments;" but in all cases it is better to make use of Lind's Anemometer, as procured at Messrs Adie and Son's, and enter the greatest force of the wind during the period of observation.

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, *so long as it is above the horizon*, is thought by some eminent astronomers to have a powerful effect in dispelling clouds, it would be well to note in the General Remarks any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

Sunshine.—The number of hours the sun shines during the day should be entered in the proper column.

Thermometer under Ground.—Though the temperature and hygrometric conditions of the air are those which chiefly influence the growth of crops, it is important for the health of the crop, and for the germination of the seed, that the soil itself should have a certain temperature. To collect facts which may illustrate this, it is recommended to have Thermometers sunk 3, 12, and 22 inches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil; and the observer should enter in the Schedule the *kind* of soil; whether drained or undrained; and whether naturally wet or dry.

Temperature of the Sea.—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river water, and as near as may be about the time of high water. A Thermometer, with its bulb fixed in a small tin pitcher, covered with a sloping lid, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. Convenient instruments are furnished by Messrs Adie and Son.

Temperature of Springs.—The temperature of Springs or Deep Wells is recommended to be taken whenever practicable, mentioning whether Spring or Well, and its depth from the surface.

Meteors, Aurora Borealis, Remarkable Depression or Elevation of Barometer, Remarkable Falls of Rain, Hail or Snow, Thunder and Lightning, etc., should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction.

Budding, Leafing, and *Flowering of Trees.*—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of leafing and flowering. *Individual* Trees or Shrubs of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same plant from year to year being noticed.

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, Princes Street, and at Mr Bryson's, 60, Princes Street, Edinburgh.

Electricity.—Pith balls suspended by a linen thread, in connection with a metallic conductor, and under cover, and the degrees of a circle being used to express the degree of repulsion, form a cheap and convenient Electrometer. Excited glass or sealing-wax ascertains the nature of the electricity.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	In Flower.	Leaf Buds first appear.	In Leaf.	Dressed of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,					Barley,				
Ash,					Bere or Bigg,				
Beech,					Oats,				
Birch,					Wheat,				
Elm,					Beans,				
Larch,					Peas,				
Lime,					Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,					Rye Grass,				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,		Strawberry,			Rail or Corn Crake,		
Mountain Ash or Rowan,					Other Birds, naming them—		
Red Flowering Currant,							
Rhododendron Ponticum,							
Whin,							

Have the goodness also to state any information you may be able to collect relative to the Crops of Grain, Hay, Potatoes, Turnips, Fruits, etc., whether plentiful, or in perfection; whether any have suffered from blight, disease, etc. Whether Epizootic disease prevails among Cattle; and the Agricultural condition of the district generally.

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Dalkeith Gardens County of Midlothian, in Lat. _____, Long. _____, Height above Sea 183 feet.

Distance from Sea 3 miles. During the MONTH of August 1850.

Days of Week.	Days of Month.	BAROMETER. 9 h. A.M. Barometer.	BAROMETER. 9 h. A.M. Attached Thermometer.	BAROMETER. 6 h. P.M. Barometer.	BAROMETER. 6 h. P.M. Attached Thermometer.	SELF-REGISTERING THERMOMETERS. Protected. Highest in Air.	Protected. Lowest in Air.	Exposed. Max. Black bulb in Sun.	Exposed. Min. Black bulb during Night.	HYGROMETER. 9 h. A.M. Dry bulb.	9 h. A.M. Wet bulb.	6 h. P.M. Dry bulb.	6 h. P.M. Wet bulb.	WIND. 9 h. A.M. Direction.	9 h. A.M. Force	6 h. P.M. Direction.	6 h. P.M. Force	RAIN. Days on which it fell.	RAIN. Amount.	CLOUD. 1 to 10	SUNSHINE. Hours.	THERMOMETERS. under Ground. ___ h. A.M. 3 inches.	12 inches.	22 inches.	Temperature of SPRING or WELL.	Temperature of SEA.	OZONE. 0 to 10	ELECTRICITY.	GENERAL REMARKS, As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	Days of Month.
		inches.	°	inches.	°	°	°	°	°	°	°	°	°					days	inches.			°	°	°	°	°				
	1	30-10	64	30-02	68	69	46			65	59	66	61	N.E.		N.													Heavy Clouds passing A.M. Exceedingly fine P.M.	1
	2	29.90	65	29.78	68	71	51			68	62	64	60	N.W.		S.W.													Passing Clouds - overcast, windy, Thunder in	2
	3	29.57	67	29.60	69	70	54			68	64	62	59	S.W.		S.W.													Passing Clouds A.M. Cloudy and showery P.M.	3
	4	29.70	66	29.63	64	65	52			66	61	62	58	S.W.		S.W.													Fine, Overcast & Thunderly overcast & Showery	4
	5	29.68	63	29.78	64	59	48			56	52	59	56	S.W.		S.W.													Passing Clouds A.M. Passing P.M. & Thunder	5
	6	29.90	63	29.98	66	65	45			61	58	64	60	N.W.		N.W.													Heavy Clouds passing A.M. Fine and pleasant	6
	7	30.00	63	30.02	69	72	48			64	59	65	60	S.W.		S.W.													Loosely Clouded A.M. Exceedingly fine P.M.	7
	8	30.00	65	30.03	69	73	48			68	62	69	64	S.W.		S.W.													Exceedingly fine throughout the day	8
	9	30.00	66	30.13	71	70	50			68	62	64	61	S.		S.													do do do do do	9
	10	30.08	66	29.99	70	71	47			64	60	64	62	S.		S.													Passing Clouds Overcast Foggy at night	10
	11	29.99	66	30.00	70	62	50			64	61	66	62	N.W.		N.W.													Fine, Overcast Thunder Wind Fog at night	11
	12	29.93	68	29.87	71	69	54			63	60	66	62	N.W.		N.													Rain early in morn Cloudy but fine	12
	13	29.84	68	29.85	72	71	56			68	65	68	64	S.W.		N.W.													Overcast throughout Thunder and Lightning	13
	14	29.78	69	29.70	70	69	50			68	61	66	62	N.W.		N.W.													Passing Clouds A.M. Overcast heavy Rain P.M.	14
	15	29.84	67	29.82	69	72	58			67	63	69	65	S.W.		S.W.													Fine pleasant throughout	15
	16	29.75	67	29.77	70	69	54			64	59	66	62	S.W.		S.													Passing clouds Overcast - Partly Fine &	16
	17	29.63	67	29.59	67	68	53			66	59	64	60	S.W.		S.													Overcast A.M. Drops of Rain.	17
	18	29.57	66	29.60	69	67	54			68	62	69	66	N.W.		N.W.													Passing Clouds A.M. Overcast P.M. Heavy at times	18
	19	29.58	67	29.55	70	66	53			67	64	69	66	N.		N.W.													Overcast Passing Clouds Thunder P.M. Squally at times	19
	20	29.68	66	29.72	67	67	51			64	60	65	63	N.W.		N.W.													Do Do Do Fine and pleasant	20
	21	29.82	69	29.90	68	69	54			65	60	64	61	N.W.		S.													Passing Clouds A.M. Partly overcast P.M.	21
	22	29.99	65	30.02	69	67	49			66	60	65	61	S.W.		N.E.													Partly overcast A.M. Exceedingly fine P.M.	22
	23	30.03	64	30.03	66	62	46			66	62	68	62	N.E.		N.E.													Cloudy overcast A.M. Fine Clear Sky P.M.	23
	24	29.99	63	29.94	66	61	49			61	58	62	58	S.W.		S.W.													Passing clouds A.M. Densely do P.M.	24
	25	29.90	66	29.99	68	63	49			60	56	59	56	N.		N.													Cirrych White clouds A.M. Dark heavy do P.M.	25
	26	29.95	58	29.99	61	62	43			60	55	60	56	S.W.		N.													Partially overcast heavy fine Overcast & Showery	26
	27	29.69	55	29.67	61	57	42			55	52	55	55	N.W.		N.W.													Variable A.M. Cloudy windy and showery	27
	28	29.60	57	29.61	60	62	40			56	53	56	54	N.W.		N.W.													Passing clouds Overcast A.M. Cloudy windy and showery	28
	29	29.61	57	29.41	59	57	42			61	58	58	55	S.		N.W.													Do cloudy Overcast with heavy showers between 3 & 4 P.M.	29
	30	29.22	58	29.31	60	59	47			61	58	56	54	S.W.		N.W.													Cloudy A.M. Calm and cloudy P.M. Smaller showers	30
	31	29.30	57	29.28	57	61	46			60	57	55	53	S.W.		S.W.													Passing clouds throughout the day	31
	Sums.	25 5		17 13 14 90		11 195	13 287			15 121	12 293	18 115	10 307																	
		924.15	1982	938-78	20	9164	16530			1781	1771	1845	1836																	
	Means.	29.817		29.803		66.3	49.2			63.9	59.4	63.7	59.9																	
		29.81	62.1	29.82	66	65.3	47.4			63.8	59.6	63.8	59.7																	
	Index Errors.					Incorrect Instrument out of Repair																									
	Correction for Diurnal Range.‡																													
	Corrected Means.																													
	No. of Column.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		

A Momentary Whirl Wind of considerable force on the 4th at 11 between 9 and 10 Minutes past 9 P.M.

Barometer, mean corrected reading of Column No. 1 (A.M.),..... = 29.817
Diameter of tube _____ inch; correction for capillarity to be added,..... + 060
Sum,..... 29.877
Correction for Temperature from Column No. 2 to be deducted,..... = − 086
Sum,..... 28.791
Mean of the above 29.778
Correction for Height above Sea-level, _____ feet, to add,..... 210
Barometer corrected and reduced to 32° and Sea-level, ... 29.988

Column No. 3 (P.M.),..... = 29.803
Capillarity,..... = + 060
Sum,..... 29.863
Temp. from Col. 4,..... = − 098
Sum,..... 29.765

Barometer, Highest observed reading of Month,..... = 30.23 on the 8th
Lowest do. do.,..... = 29.22 on the 30
Difference, or Monthly Range,..... = 1.01

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	1	2	0	0	3	14	3	8	0	—
P.M.	3	3	3	0	2	8	3	9	0	—

Dry bulb Thermometer (mean of Cols. 9 and 11),* 63.8
Wet bulb Thermometer (mean of Cols. 10 and 12),* 59.6
† Dew-point Temperature,..... 56.1
† Elastic Force of Vapour,..... .452 inch
† Weight of Vapour in a Cubic Foot of Air,.....
† Additional Weight required to Saturate a Cubic Foot,.....
† Degree of Humidity (Saturation 100),..... 77

Highest Reading Self-Registering Thermometer in Air and Protected, ... on the _____
Lowest do. do. do., ... on the _____
Difference, being Monthly Range,..... Instruments out of Repair.
Mean of Self-Registering Thermometers in Air and Protected, ...
Mean Daily Range in Air and Protected, ...
Greatest Daily Range, do., ...
Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... on the _____
Lowest do. do. from Radiation during Night, _____ on the _____

(Signed) W Thomson
(Designation) Gardener

* If the readings are taken at 9h and 3h, the 9h readings to be alone taken to account, as the correction for Diurnal Range in Scotland is unknown.
† All these calculated from Glaisher's Hygrometric Tables, Second Edition *only*.
‡ The Diurnal Range for Scotland is as yet unknown.

N.B.—This Schedule should be returned (post-paid) as early as possible after the completion of the Month, with the Sums correctly added, and the Means deduced. No Wax or Wafers ever to be employed in closing the Schedule—the Gummed Corner to be alone used.

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

THOSE persons who kindly furnish Monthly Tables of the Weather to the Scottish Meteorological Society are requested to attend to the following Instructions, seeing that one of the most important ends of Meteorological Observations is their being comparable with one another; and for this purpose it is requisite that all should, if possible, observe at a like hour, and in a like manner, and have their instruments placed, in so far as circumstances allow, in a like position:

Hour of Observation.—All instruments which are observed twice a-day, should be read at the same hour morning and evening, in order to furnish mean results. The Society recommends *a quarter before nine o'clock, morning and evening*, as the most convenient hour; but should this be inconvenient for the observer, another hour may be chosen, attending, however, to the above rule, that the evening and morning readings be taken at the same hour, and this hour entered on the Schedule.

Barometer.—Barometers of Messrs Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined, in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will strike against the upper end of the tube with a sharp tap. The mercury should then completely fill the tube. If any air has got admittance, it should be driven into the cistern by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

The Barometer should be hung in a good light, and perfectly perpendicular, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading, to prevent adhesion of the mercury to the tube. In reading, the eye ought to be placed on the exact level of the top of the column of mercury. The reading of the attached Thermometer ought always to be the first taken, as the heat of the breath, or the proximity of the person, are apt to influence its readings.

The corrections necessary to be applied for the Barometric readings depend on the form of the instrument. The mode of making these corrections, and the tables employed for the purpose, will be found in the "Report of the Committee of the Royal Society on Physics and Meteorology," 1840, price 1s. The daily readings of the Barometer ought to be entered on the Schedule *as read off*, and the corrections only applied to the mean for the month.

Self-Registering Thermometers and Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as near as may be *four feet* from the general surface of the ground. Whatever means are finally adopted to fix the instruments should be mentioned, and should not be changed (without due notice to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

The *Self-Registering Thermometers* should be placed horizontal. In the case of the ordinary *maximum* Thermometer, with clay, glass, or steel index, the bulb must be somewhat elevated, in order that the mercurial column may be sufficiently aided by the force of gravity in pushing forward the float or index; and in the case of the *minimum* Thermometer, the bulb must be slightly depressed, to prevent a draining of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These Thermometers, if read once a-day, should *always be read on the evenings*, so that the temperature of the day may be entered on the Schedule as *read* by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The time of high water. A Thermometer, with its bulb fixed in a small instruments are taken from that extremity of the column tin pitcher, covered with a sloping lid, and with a weight attached, nearest the *head of the column* of mercury or of spirit. is sunk to the required depth, and in ten minutes drawn up and read.

The *maximum* Registering Thermometer, for taking the ex- Convenient instruments are furnished by Messrs Adie and Son. treme heat of the sun's rays, should have its bulb blackened and *Temperature of Springs.*—The temperature of Springs or Deep the surface rendered dull, and it should be mounted in a black- Wells is recommended to be taken whenever practicable, men- ened box, whose sides should be so high as to protect the bulb tioning whether Spring or Well, and its depth from the surface. from wind. It should be so placed that the sun's rays have free *Meteors, Aurora Borealis, Remarkable Depression or Elevation* access to it during the heat of the day. *of Barometer, Remarkable Falls of Rain, Hail or Snow, Thunder* The *minimum* Registering Thermometer, for ascertaining the *and Lightning*, etc., should be specially noticed, together with lowest temperature during the night from radiation, should have the exact hour at which they were first seen, their continuance, its bulb similarly blackened and rendered dull, and be similarly and direction.

mounted. It should be laid out, about sunset, over grass, in a *Budding, Leafing*, and *Flowering of Trees.*—It is necessary to place freely exposed to the sky, but raised on wooden supports a bear in mind that varieties of the same species of tree differ widely few inches above the surface, and covered during the day. in their times of leafing and flowering. *Individual* Trees or Shrubs

Hygrometer.—The *wet* bulb requires the muslin to be changed of each kind should therefore be chosen (if possible early kinds), be often changed. In towns once a month, or oftener if the and their indications should be alone noted—always the same weather is dusty, and the muslin gets foul; in the country plant from year to year being noticed.

whenever the muslin seems to be foul. The bulb should be *Ozone.*—Mention whether Schonbein's or Moffat's scale and covered with thin tissue or blotting paper below the muslin. papers are used. Schonbein's are preferred. They may be had the muslin should always be thoroughly wetted and freed from at Messrs Adie and Son's, 59, Princes Street, and at Mr starch, before being used; and the cotton wick which conducts Bryson's, 60, Princes Street, Edinburgh.

moisture to it should be previously soaked in a solution of washing *Electricity.*—Pith balls suspended by a linen thread, in connec- soda, and then in pure water, before being attached. tion with a metallic conductor, and under cover, and the degrees it may be thoroughly wetted, else it will conduct the moisture of a circle being used to express the degree of repulsion, form a imperfectly, and yield false results. In frosty weather, water cheap and convenient Electrometer. Excited glass or sealing-wax ascertains the nature of the electricity.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	In Flower.	Leaf Buds first appear.	In Leaf.	Divested of Leaves.
Alder,				
Ash,				
Beech,				
Birch,				
Elm,				
Larch,				
Lime,				
Oak,				
Sycamore or Plane,				

CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Barley,				
Bere or Bigg,				
Oats,				
Wheat,				
Beans,				
Pease,				
Potatoes,				
Turnips,				
Rye Grass,				

SHRUBS, ETC.	First in Blossom.
Barberry,	
Bourtree or Elder,	
Broom,	
Hazel,	
Hawthorn,	
Holly,	
Laburnum,	
Lilac,	
Mezereon,	
Mountain Ash or Rowan,	
Red Flowering Currant,	
Rhododendron Ponticum,	
Whin,	

FRUITS.	First in Blossom.	Fruit Ripe generally.
Apple,		
Black Currant,		
Cherry,		
Gean,		
Gooseberry,		
Peach,		
Pear,		
Plum,		
Strawberry,		

MIGRATORY BIRDS.	First Arrival.	Departure.
Cuckoo,		
Curlew,		
House-Swallow,		
Lapwing,		
Plover,		
Sand-Martin,		
Starling,		
Swan,		
Rail or Corn Crake,		
Other Birds, naming them—		

Have the goodness also to state any information you may be able to collect relative to the Crops of Grain, Hay, Potatoes, Turnips, Fruits, etc., whether plentiful, or in perfection; whether any have suffered from blight, disease, etc. Whether Epizootic disease prevails among Cattle; and the Agricultural condition of the district generally.

Dear Sir

I find I am unable to correct the sheet for July – it is properly transcribed but the thermometer must have been wrong I dare I have had them all sent to Kyles this week by Mr Bryson yours truly W Thomson

METEOROLOGICAL RETURNS.

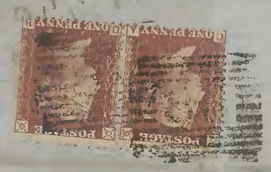
EDINBURGH.

21, Rutland Street,

Sec., Meteorological Society,

DR STARK,

To



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SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Dalkeith Gardens, County of Midlothian, in Lat. _____, Long. _____, Height above Sea 183 feet.

Distance from Sea 3 miles. During the MONTH of September 1858.

Days of Week.	Days of Month.	BAROMETER. 9 h. A.M. Barometer.	BAROMETER. 9 h. A.M. Attached Thermometer.	BAROMETER. 6 h. P.M. Barometer.	BAROMETER. 6 h. P.M. Attached Thermometer.	SELF-REGISTERING THERMOMETERS. Protected. Highest in Air.	SELF-REGISTERING THERMOMETERS. Protected. Lowest in Air.	SELF-REGISTERING THERMOMETERS. Exposed. Max. Black bulb in Sun.	SELF-REGISTERING THERMOMETERS. Exposed. Min. Black bulb during Night.	HYGROMETER. 9 h. A.M. Dry bulb.	HYGROMETER. 9 h. A.M. Wet bulb.	HYGROMETER. 6 h. P.M. Dry bulb.	HYGROMETER. 6 h. P.M. Wet bulb.	WIND. 9 h. A.M. Direction.	WIND. 9 h. A.M. Force.	WIND. 6 h. P.M. Direction.	WIND. 6 h. P.M. Force.	RAIN. Days on which it fell.	RAIN. Amount.	CLOUD. 1 to 10	SUNSHINE. Hours.	THERMOMETERS. under Ground. h. A.M. 3 inches.	THERMOMETERS. under Ground. h. A.M. 12 inches.	THERMOMETERS. under Ground. h. A.M. 22 inches.	Temperature of SPRING or WELL.	Temperature of SEA.	OZONE. 0 to 10	ELECTRICITY.	GENERAL REMARKS, As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	Days of Month.
		inches.	°	inches.	°	°	°	°	°	°	°	°	°					days.	inches.			°	°	°	°	°				
	1	29.29	58	29.34	60	61	47			59	55	63	58	N		S.E													Dark & heavy clouds passing A.M. Breezy & Fine P.M.	1
	2	29.57	57	29.28	60	63	46			62	58	62	60	N.		N.													Variable A.M. Heavy rain P.M.	2
	3	29.42	59	29.60	61	62	51			59	56	60	56	S.W		S.W													Cloudy throughout the day	3
	4	29.49	58	29.50	61	63	48			60	57	58	54	N.W		S.W													Passing clouds with fine intervals	4
	5	29.54	57	29.49	60	65	41			57	54	61	58	S.W		S.W													Passing clouds A.M. Cloudy and showery	5
	6	29.52	55	29.39	58	63	40			62	60	56	53	N.		S.W													Dark heavy clouds passing A.M. Showery	6
	7	29.45	58	29.52	61	62	50			59	56	58	55	S.W		S.W													Fine pleasant day throughout	7
	8	29.68	58	29.65	62	61	48			58	55	57	55	N.		S.W													Exceedingly fine throughout the day	8
	9	29.55	59	29.54	62	68	49			64	62	64	61	S.W		N.													Cloudy and showery throughout	9
	10	29.52	60	29.33	62	63	48			61	58	62	60	N.		N.													Cloudy windy and showery	10
	11	29.54	60	29.80	62	67	47			60	57	64	60	S.W		S.W													Fine pleasant day throughout	11
	12	29.90	62	29.97	65	71	39			67	60	70	65	S.W		S.W													Rain at night & fine	12
	13	29.99	62	30.07	62	60	49			66	64	60	58	N.W		E.													Rain early A.M. Fine P.M.	13
	14	30.17	61	30.18	62	62	49			59	56	58	55	N.E		N.													Partially overcast A.M. Densely do. P.M.	14
	15	29.99	62	29.98	65	67	50			60	58	62	59	S.		S.													Densely overcast A.M. Showery	15
	16	29.88	63	29.78	65	69	50			60	54	61	58	N.E		E.													Densely overcast A.M. Partially do. P.M.	16
	17	29.68	64	29.57	65	66	55			62	58	61	59	N.E		E.													Cloudy & hazy throughout	17
	18	29.61	63	29.91	65	68	56			58	55	56	53	E.		N.E													Thickly clouded with occasional clear spaces	18
	19	30.09	61	30.10	61	63	43			58	54	55	53	N.E		N.E													Fine pleasant days throughout	19
	20	30.12	57	30.10	59	65	39			52	50	54	51	N.W		N.W													Remarkably fine throughout	20
	21	30.12	55	30.02	58	63	38			51	48	54	52	N.W		N.													Exceedingly fine throughout	21
	22	29.87	55	29.61	59	59	40			54	51	53	51	N.E		N.E													Partially overcast Densely do. Showery	22
	23	29.40	58	29.38	61	64	53			60	58	60	58	S.E		N.E													Passing clouds with fine intervals throughout	23
	24	29.66	59	30.12	60	59	51			56	50	51	47	N.W		N.W													Do Do Do Do	24
	25	30.10	57	30.18	61	61	50			56	53	59	54	S.W		S.W													Dark heavy clouds passing Partially Overcast	25
	26	30.21	60	30.11	63	63	51			59	56	61	58	S.W		S.W													Passing clouds with fine intervals	26
	27	29.90	62	29.80	63	65	55			61	59	56	54	S.W		S.W													Dark heavy clouds passing throughout	27
	28	30.01	57	30.02	58	58	42			52	47	58	56	S.W		S.W													Exceedingly fine throughout	28
	29	29.91	54	29.68	55	53	44			49	47	51	50	S.E		S.E													Fine early A.M. Densely overcast & Showery P.M.	29
	30	29.32	56	29.49	53	58	50			55	53	47	48	W.		W.													Passing clouds and showers Clear	30
	31																													31
Sums.		22 58		22 44		98	937			95	163																			
		893-58	1767	893-14	1829	1905	1437			1748	1663	1763	1677																	
Means.		29.753		29.748			47.9			57.9	55.4																			
		29.78	58.23	29.77	60.29	63.16	44.23			58.23	55.29																			
Index Errors.																														
Correction for Diurnal Range.‡																														
Corrected Means.																														
No. of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		

Barometer, mean corrected reading of Column No. 1 (A.M.),..... = 29.753
Diameter of tube _____ inch; correction for capillarity to be added,..... + 060
Sum,..... 29.813
Correction for Temperature from Column No. 2 to be deducted,..... = − 075
Sum,..... 29.738
Mean of the above 29.742
Correction for Height above Sea-level, _____ feet, to add,..... 210
Barometer corrected and reduced to 32° and Sea-level, ... 29.952

Column No. 3 (P.M.),..... = 29.728
Capillarity,..... = + 060
Sum,..... 29.828
Temp. from Col. 4,..... = − 081
Sum,..... 29.747

Barometer, Highest observed reading of Month,..... = 30.21 on the 26th
Lowest do. do.,..... = 29.28 on the 2nd
Difference, or Monthly Range,..... = 0.93

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	0	5	1	2	1	10	6	5	0	-
P.M.	2	3	5	0	2	11	5	2	0	-

Dry bulb Thermometer (mean of Cols. 9 and 11),* [redacted]
Wet bulb Thermometer (mean of Cols. 10 and 12),* [redacted]
† Dew-point Temperature, [redacted]
† Elastic Force of Vapour, [redacted]
† Weight of Vapour in a Cubic Foot of Air, [redacted]
† Additional Weight required to Saturate a Cubic Foot, [redacted]
† Degree of Humidity (Saturation 100), 79

Highest Reading Self-Registering Thermometer in Air and Protected, ... 71 on the 12th
Lowest do. do. do., ... 38 on the 21st
Difference, being Monthly Range, ... 33
Mean of Self-Registering Thermometers in Air and Protected, ... 55.5
Mean Daily Range in Air and Protected, ... 15.2
Greatest Daily Range, do., ... _____
Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... _____ on the _____
Lowest do. do. from Radiation during Night, _____ on the _____

(Signed) Wm Bonnar
(Designation) Gardener

* If the readings are taken at 9h. and 3h., the 9h. readings to be alone taken to account, as the correction for Diurnal Range in Scotland is unknown.
† All these calculated from Glaisher's Hygrometric Tables, Second Edition *only*.
‡ The Diurnal Range for Scotland is as yet unknown.

N.B.—This Schedule should be returned (post-paid) as early as possible after the completion of the Month, with the Sums correctly added, and the Means deduced. No Wax or Wafers ever to be employed in closing the Schedule—the Gummed Corner to be alone used.

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

THOSE persons who kindly furnish Monthly Tables of the Weather to the Scottish Meteorological Society are requested to attend to the following Instructions, seeing that one of the most important ends of Meteorological Observations is their being comparable with one another; and for this purpose it is requisite that all should, if possible, observe at a like hour, and in a like manner, and have their instruments placed in as like circumstances allow, in a like position:

Hour of Observation.—All instruments which are observed twice a-day, should be read at the same hour morning and evening, in order to furnish mean results. The Society recommends the same hour, and this hour entered on the Schedule.

Barometer.—Barometers of Messrs Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined, in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will strike against the upper end of the tube with a sharp tap. The mercury should then completely fill the tube. If any air has got admittance, it should be driven into the cistern by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

The Barometer should be hung in a good light, and perfectly perpendicular, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading, to prevent adhesion of the mercury to the tube. In reading, the eye ought to be placed on the exact level of the top of the column. In reading the attached Thermometer ought always to be the first taken, as the heat of the breath, or the proximity of the person, are apt to influence its readings.

The corrections necessary to be applied to the Barometric readings depend on the form of the instrument. The mode of making these corrections, and the tables employed for the purpose, will be found in the "Report of the Committee of the Royal Society on Physics and Meteorology," 1840, price 1s. The daily readings of the Barometer ought to be entered on the Schedule *as read off*, and the corrections only applied to the mean for the month.

Self-Registering Thermometers and Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and at as many be *four feet* from the general surface of the ground. Different contrivances are used for this purpose, either a north window, and projecting 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in a double meat-safe ventilated by with louvre-boarded sides, fixed in an exposed places, and if possible over grass. Whatever means are finally decided on, the position of the instruments should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

The *Self-Registering Thermometers* should be hung in a good light, and perfectly horizontal. In the case of the ordinary *minimum* Thermometers with clay, glass, or steel index, the bulb must be elevated, in order that the mercurial column may run down, aided by the force of gravity in pushing the index; and in the case of the *minimum* Thermometer, the bulb must be slightly depressed, to prevent a drain-back of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These Thermometers, if read once a-day, should always be read on the evenings, so that the highest temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the *head of the column* of mercury or spirit.

The *maximum* Registering Thermometer, for taking the extreme heat of the sun's rays, should have its bulb blackened and the surface rendered dull, and it should be mounted in a blackened box, whose sides should be so high as to protect the bulb from wind. It should be so placed that the sun's rays have free access to it during the heat of the day.

The *minimum* Registering Thermometer, for ascertaining the lowest temperature during the night from radiation, should have its bulb similarly blackened and rendered dull, and be similarly mounted. It should be laid out, about sunset, over grass, in a place freely exposed to the sky, but raised on wooden supports a few inches above the surface, and removed during the day.

Hygrometer.—The *wet* bulb requires the most attention, as it will be often changed. In towns once a month, or oftener, if the weather is dusty, and the muslin gets foul. The bulb should be covered with thin tissue or blotting paper, before being wetted, and freed from whenever the muslin seems to be foul. The muslin should always be thoroughly wetted, and freed from the cotton wick which conducts moisture to it. It should be previously soaked in a solution of washing soda, and then in pure water, before being attached, in order that it will conduct the moisture freely, and yield false results. In frosty weather, water must be poured over the wet bulb, so as to form a thin film of ice on the muslin, the evaporation from the ice going on as from the simply wetted bulb.

Rain Gauge.—As "Fleming's Rain Gauges" seem to possess several advantages over others, the Society gives the preference to them; but whatever form be employed, in order that all the stations may yield comparable results, it is recommended that the Gauge be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of *close cut grass*, in a place as distant as possible from trees, houses, high walls, and irregular or broken ground, and the quantity of Rain should, if possible, be registered daily. When more than one Rain Gauge is kept, they ought to be placed near each other, but at different heights above the ground, and their indications noted in the *general remarks*, mentioning their height above ground—the regular column in the Schedule being reserved for the ground Rain Gauge alone.

Winds.—Isolated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately over head, that is, in or near the zenith of the observer. The motion of the higher strata of clouds gives no such indication. Failing the clouds, the general direction of the smoke of a hamlet or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. For mode of estimating the force of the wind, see "Directions for Reading Instruments;" but in all cases it is better to make use of Kind's Anemometer, as procured at Messrs Adie and Son's, and enter the greatest force of the wind during the period of observation.

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, *so long as it is above the horizon*, is thought by some eminent astronomers to have a powerful effect in dispelling clouds, it would be well to note in the General Remarks any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

Sunshine.—The number of hours the sun shines during the day should be entered in the proper column.

Thermometers under Ground.—Though the temperature and hygrometric conditions of the air are those which chiefly influence the growth of crops, it is important for the health of the crop, and for the germination of the seed, that the soil itself should have a certain temperature. To collect facts which may illustrate this, it is recommended to have Thermometers sunk 3, 12, and 22 inches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil; and the observer should enter in the Schedule the *kind* of soil; whether drained or undrained; and whether naturally wet or dry.

Temperature of the Sea.—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river water, and as near as may be about the time of high water. A Thermometer, with its bulb fixed in a small tin pitcher, covered with a sloping lid, and with a weight attached, issunk to the required depth, and in ten minutes drawn up and read. Convenient instruments are furnished by Messrs Adie and Son.

Temperature of Springs.—The temperature of Springs or Deep Wells is recommended to be taken whenever practicable, mentioning whether Spring or Well, and its depth from the surface.

Meteors, Aurora Borealis, Remarkable Depression or Elevation of Barometer, Remarkable Falls of Rain, Hail or Snow, Thunder and Lightning, etc., should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction.

Budding, Leafing, and *Flowering of Trees.*—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of leafing and flowering. *Individual* Trees or Shrubs of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same plant from year to year being noticed.

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, Princes Street, and at Mr Bryson's, 60, Princes Street, Edinburgh.

Electricity.—Pith balls suspended by a linen thread, in connection with a metallic conductor, and under cover, and the degrees of a circle being used to express the degree of repulsion, form a cheap and convenient Electrometer. Excited glass or sealing-wax ascertains the nature of the electricity.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	In Flower.	Leaf Buds first appear.	In Leaf.	Divested of Leaves.
Alder,				
Ash,				
Beech,				
Birch				
Elm,				
Larch,				
Lime,				
Oak,				
Sycamore or Plane,				

CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Barley,				
Bere or Bigg,				
Oats,				
Wheat,				
Beans,				
Pease,				
Potatoes,				
Turnips,				
Rye Grass,				

SHRUBS, ETC.	First in Blossom.
Barberry,	
Bourtree or Elder,	
Broom,	
Hazel,	
Hawthorn,	
Holly,	
Laburnum,	
Lilac,	
Mezereon,	
Mountain Ash or Rowan,	
Red Flowering Currant,	
Rhododendron Ponticum,	
Whin,	

FRUITS.	First in Blossom.	Fruit Ripe generally.
Apple,		
Black Currant,		
Cherry,		
Gean,		
Gooseberry,		
Peach,		
Pear,		
Plum,		
Strawberry,		

MIGRATORY BIRDS.	First Arrival.	Departure.
Cuckoo,		
Curlew,		
House-Swallow,		
Lapwing,		
Plover,		
Sand-Martin,		
Starling,		
Swan,		
Rail or Corn Crake,		
Other Birds, naming them—		

Have the goodness also to state any information you may be able to collect relative to the Crops of Grain, Hay, Potatoes, Turnips, Fruits, etc., whether plentiful, or in perfection; whether any have suffered from blight, disease, etc. Whether Epizootic disease prevails among Cattle; and the Agricultural condition of the district generally.

METEOROLOGICAL RETURNS.

EDINBURGH.

21, Rutland Street,

Sec., Meteorological Society,

DR STARK,

To

[redacted]

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SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Dalkeith Gardens, County of Midlothian, in Lat. ____, Long. ____, Height above Sea 183 feet.

Distance from Sea 3 miles. During the MONTH of October 1859.

Days of Week.	Days of Month.	BAROMETER. 9 h. A.M. Barometer.	Attached Thermometer	BAROMETER. 6 h. P.M. Barometer.	Attached Thermometer	SELF-REGISTERING THERMOMETERS. Protected. Highest in Air.	Lowest in Air.	Exposed. Max. Black bulb in Sun.	Min. Black bulb during Night.	HYGROMETER. 9 h. A.M. Dry bulb.	Wet bulb.	6 h. P.M. Dry bulb.	Wet bulb.	WIND. 9 h. A.M. Direction.	Force	6 h. P.M. Direction.	Force	RAIN. Days on which it fell.	Amount.	CLOUD. 1 to 10	SUNSHINE. Hours.	THERMOMETERS. under Ground. h. A.M. 3 inches.	12 inches.	22 inches.	Temperature of SPRING or WELL.	Temperature of SEA.	OZONE. 0 to 10	ELECTRICITY.	GENERAL REMARKS, As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	Days of Month.
		inches.	°	inches.	°	°	°	°	°	°	°	°	°					days	inches.			°	°	°	°	°				
	1	29.57	47	29.37	53	56	41			50	48	47	45	S. W.		W.													Cloudy with fine intervals Showy P.M.	1
	2	29.57	45	29.51	54	59	42			50	46	54	51	S. W.		S. W.													Dark heavy clouds A.M. Overcast Showy	2
	3	29.43	47	29.46	59	63	50			59	57	60	57	S. W.		S. W.													Passing clouds and Showy. A.M. Windy	3
	4	29.57	47	29.32	55	55	47			50	47	47	44	S.		S. W.													Passing clouds with fine interval Slight Showers	4
	5	29.28	52	29.40	52	53	40			48	43	46	44	S. W.		N. W.													Passing clouds with fine intervals Showery	5
	6	29.70	48	29.54	51	51	35			41	37	43	42	W.		S. W.													Passing clouds. Overcast and Showery	6
–	7	28.66	51	28.73	50	48	40			53	50	41	40	W.		W.													Cloudy windy and Showery	7
	8	29.27	46	29.48	47	46	35			43	40	41	38	W.		S. W.													Clouds with fine intervals Showery at night	8
	9	29.51	46	29.48	49	50	34			45	43	45	44	S. W.		S. W.													Passing clouds. Densely Do and Showery Windy	9
	10	29.17	48	29.05	47	46	40			45	44	43	41	S. W.		S. W.													Heavy rain Ato 2 PM Spitting Do throughout	10
	11	29.33	47	29.40	45	50	37			44	43	44	42	S. W.		S. W.													Spitting rain early. Fine pleasant day Showery	11
	12	29.57	47	29.57	50	49	35			45	43	46	44	S. W.		S. W.													Partially overcast Densely Do and Showery	12
	13	29.67	49	29.82	52	56	35			49	46	48	46	S. W.		S.													Dark heavy clouds passing. Overcast Showery	13
	14	29.21	51	29.22	53	60	42			53	53	56	54	S. W.		S. W.													Do Do Do Do Do	14
	15	29.84	54	29.71	52	47	44			47	46	46	45	N. E.		N. E.													Constant rain throughout the day	15
	16	29.64	54	29.71	52	51	45			47	47	49	48	N.		E.													Heavy rain A.M. Densely throughout	16
	17	29.72	52	29.79	50	44	43			44	43	40	39	N. E.		E.													Do Do Do Do Do	17
	18	29.83	47	29.95	46	45	36			39	37	40	37	N. E.		N. E.													Cold cloudy and windy. Do Do Showery	18
	19	29.84	45	29.92	46	45	35			44	40	44	40	N. E.		E.													Dark heavy Clouds passing and Showery	19
	20	29.75	45	29.69	48	47	31			45	44	46	46	N. E.		N. E.													Overcast throughout with light Showers	20
	21	29.75	49	29.81	50	52	44			46	45	49	48	S.		S. W.													Misty Small rain very miles throughout	21
	22	29.91	48	29.97	48	50	34			40	39	39	39	S.		S. W.													Exceedingly fine throughout	22
	23	29.99	45	30-01	46	48	32			37	37	38	38	S. W.		S.													Densely Clouded and misty throughout	23
	24	29.99	44	30-00	45	53	31			39	38	42	41	S.		N. W.													Fine pleasant day throughout Misty at night	24
	25	30-10	44	30.17	45	49	38			39	38	40	39	S. W.		S. E.													Do Do Do Do Do	25
	26	30.10	43	30-01	46	50	31			39	38	46	44	S.		S. E.													Misty but fine A.M. Cloudy and Showery	26
	27	29.91	50	29.91	51	55	45			52	50	47	45	S. W.		S.													Partially overcast throughout Clear	27
	28	29.08	49	30-05	49		36					40	39	S. W.		N. W.													Passing clouds Passing to and Showery	28
	29	30-28	44	30.37	44	45	31			36	34	41	39	N. W.		W.													Fine and pleasant Overcast Partly at night	29
	30	30.38	43	30.32	44	46	28			37	35	44	40	W.		S. W.													Misty throughout Showery at night	30
	31	30.39	47	30-32	48	52	41			48	46	48	47	S. W.		S. W.													Densely Overcast throughout	31
Sums.		20 91 / 909.90	1502	15 11 / 22.27 / 932.81	1517	15 17 / 21 / 233	1173			1356	1300	1399	1345																		
Means.		29.674		29.718		50.7	37.2			45.1	43.3	45.0	43.4																		
Index Errors.																														
Correction for Diurnal Range.‡																														
Corrected Means.																														
No. of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		

Barometer, mean corrected reading of Column No. 1 (A.M.),..... = 29.674
Column No. 3 (P.M.),..... = 29.718
Barometer, Highest observed reading of Month,..... = 30.38 on the 30th
Diameter of tube ____ inch; correction for capillarity to be added,..... + 060
Capillarity,..... = + 060
Lowest do. do.,..... = 28.66 on the 7th
Sum,..... 29.734
Sum,..... 29.778
Difference, or Monthly Range,..... = 1.72
Correction for Temperature from Column No. 2 to be deducted,..... = – 046
Temp. from Col. 4,..... = – 046
Sum,..... 29.688
Sum,..... 29.732

Mean of the above 29.710

Correction for Height above Sea-level, ____ feet, to add,..... 210

Barometer corrected and reduced to 32° and Sea-level, ... 29.920

SUMMARY OF THE WINDS

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	1	5	0	0	3	13	8	1	0	–
P.M.	0	3	3	2	2	14	4	3	0	–
	½	4	1½	1	2½	13½	6	2		

Dry bulb Thermometer (mean of Cols. 9 and 11),*.....
Wet bulb Thermometer (mean of Cols. 10 and 12),*.....
† Dew-point Temperature,.....
† Elastic Force of Vapour,.....
† Weight of Vapour in a Cubic Foot of Air,.....
† Additional Weight required to Saturate a Cubic Foot,.....
† Degree of Humidity (Saturation 100),.....

[redacted]

Highest Reading Self-Registering Thermometer in Air and Protected,..... 63° on the 3d
Lowest do. do. do.,..... 28° on the 30th
Difference, being Monthly Range,..... 35°
Mean of Self-Registering Thermometers in Air and Protected,..... 45.7
Mean Daily Range in Air and Protected,..... 17.0
Highest Daily Range, do.,..... 22 on the 24th
Highest Reading Self-Registering Black Bulb Thermometer in Sun,..... on the
Lowest do. do. from Radiation during Night,..... on the

* If the readings are taken at 9h. and 3h., the 9h. readings to be alone taken to account, as the correction for Diurnal Range in Scotland is unknown.
† All these calculated from Glaisher's Hygrometric Tables, Second Edition *only*.
‡ The Diurnal Range for Scotland is as yet unknown.

(Signed) Wm Thomson
(Designation) Gardener

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INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

THOSE persons who kindly furnish Monthly Tables of the Weather to the Scottish Meteorological Society are requested to attend to the following Instructions, seeing that one of the most important ends of Meteorological Observations is their being comparable with one another; and for this purpose it is requisite that all should, if possible, observe at a like hour, and in a like manner, and have their instruments placed, in so far as circumstances allow, in a like position:

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The Barometer should be hung in a good light, and perfectly perpendicular, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading, to prevent adhesion of the mercury to the tube. In reading, the eye ought to be placed on the exact level of the top of the column of mercury. The reading of the attached Thermometer ought always to be the first taken, as the heat of the breath, or the proximity of the person, are apt to influence its readings.

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Rain Gauge.—As "Fleming's Rain Gauges" seem to possess several advantages over others, the Society gives the preference to them; but whatever form be employed, in order that all the stations may yield comparable results, it is recommended that the Gauge be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of *close cut grass*, in a place as distant as possible from trees, houses, high walls, and irregular or broken ground, and the quantity of Rain should, if possible, be registered daily. When more than one Rain Gauge is kept, they ought to be placed near each other, but at different heights above the ground, and their indications noted in the *general remarks*, mentioning their height above ground—the regular column in the Schedule being reserved for the ground Rain Gauge alone.

Winds.—Isolated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately over head, that is, in or near the zenith of the observer. The motion of the higher strata of clouds gives no such indication. Failing the clouds, the general direction of the smoke of a hamlet or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. For mode of estimating the force of the wind, see "Directions for Reading Instruments;" but in all cases it is better to make use of Lind's Anemometer, as procured at Messrs Adie and Son's, and enter the greatest force of the wind during the period of observation.

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, *so long as it is above the horizon*, is thought by some eminent astronomers to have a powerful effect in dispelling clouds, it would be well to note in the General Remarks any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

Sunshine.—The number of hours the sun shines during the day should be entered in the proper column.

Thermometers under Ground.—Though the temperature and hygrometric conditions of the air are those which chiefly influence the growth of crops, it is important for the health of the crop, and for the germination of the seed, that the soil itself should have a certain temperature. To collect facts which may illustrate this, it is recommended to have Thermometers sunk 3, 12, and 22 inches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil; and the observer should enter in the Schedule the *kind* of soil; whether drained or undrained; and whether naturally wet or dry.

Temperature of the Sea.—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river water, and as near as may be about the time of high water. A Thermometer, with its bulb fixed in a small tin pitcher, covered with a sloping lid, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. Convenient instruments are furnished by Messrs Adie and Son.

Temperature of Springs.—The temperature of Springs or Deep Wells is recommended to be taken whenever practicable, mentioning whether Spring or Well, and its depth from the surface.

Meteors, Aurora Borealis, Remarkable Depression or Elevation of Barometer, Remarkable Falls of Rain, Hail or *Snow, Thunder* and *Lightning*, etc., should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction.

Budding, Leafing, and *Flowering of Trees.*—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of leafing and flowering. *Individual* Trees or Shrubs of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same plant from year to year being noticed.

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, Princes Street, and at Mr Bryson's, 60, Princes Street, Edinburgh.

Electricity.—Pith balls suspended by a linen thread, in connection with a metallic conductor, and under cover, and the degrees of a circle being used to express the degree of repulsion, form a cheap and convenient Electrometer. Excited glass or sealing-wax ascertains the nature of the electricity.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	In Flower.	Leaf Buds first appear.	In Leaf.	Divested of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,					Barley,				
Ash,					Bere or Bigg,				
Beech,					Oats,				
Birch,					Wheat,				
Elm,					Beans,				
Larch,					Pease,				
Lime,					Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,					Rye Grass,				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,		Strawberry,			Rail or Corn Crake,		
Mountain Ash or Rowan,					Other Birds, naming them—		
Red Flowering Currant,							
Rhododendron Ponticum,							
Whin,							

Have the goodness also to state any information you may be able to collect relative to the Crops of Grain, Hay, Potatoes, Turnips, Fruits, etc., whether plentiful, or in perfection; whether any have suffered from blight, disease, etc. Whether Epizootic disease prevails among Cattle; and the Agricultural condition of the district generally.

[redacted]

To

DR STARK,

Sec., Meteorological Society,

21, *Rutland Street,*

EDINBURGH.

METEOROLOGICAL RETURNS.

Cel

Dalkeith

DALKEITH

NO 1858

U M EDINBURGH NO 23 58

42

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Dalkeith Gardens County of Midlothian, in Lat. _____, Long. _____, Height above Sea 183 feet.

Distance from Sea 8 miles. During the MONTH of November 185[illegible].

Days of Week.	Days of Month.	BAROMETER. 9 h. A.M. Barometer.	Attached Thermometer	6 h. P.M. Barometer.	Attached Thermometer	SELF-REGISTERING THERMOMETERS. Protected. Highest in Air.	Lowest in Air.	Exposed. Max. Black bulb in Sun.	Min. Black bulb during Night.	HYGROMETER. 9 h. A.M. Dry bulb.	Wet bulb.	6 h. P.M. Dry bulb.	Wet bulb.	WIND. 9 h. A.M. Direction.	Force	6 h. P.M. Direction.	Force	RAIN. Days on which it fell.	Amount.	CLOUD. 1 to 10	SUNSHINE. Hours.	THERMOMETERS. under Ground. ___ h. A.M. 3 inches.	12 inches.	22 inches.	Temperature of SPRING or WELL.	Temperature of SEA.	OZONE. 0 to 10	ELECTRICITY.	GENERAL REMARKS. As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	Days of Month.
		inches.	°	inches.	°	°	°	°	°	°	°	°	°					days.	inches.			°	°	°	°	°				
	1	30-30	49	30-41	51	53	45			48	47	44	43	N.		N.													Overcast and misty. Clear Night	1
	2	30-29	47	30-30	48	50	38			44	42	41	40	N.		N.													Rules. Overcast. Fine. Foggy Clear. Fine	2
	3	30-22	47	30-20	48	51	33			43	39	46	45	N.		S.													Densely overcast. throughout. and Foggy	3
	4	30-18	48	30.13	48	52	44			45	44	48	44	N.		N.													Slightly overcast. and misty throughout	4
	5	30-01	48	30-35	46	47	45			46	46	38	36	N.		N.E.													C. Indefinite clouds prevailed below 10 a.m.	5
	6	30-37	44	30-39	43	40	36			40	36	38	36	N.E.		N.E.													Partially overcast throughout. Clear night	6
	7	30-37	41	30-20	42	45	29			43	42	39	36	N.		N.													Passing clouds throughout the days	7
	8	30-22	42	30-33	44	46	35			40	39	47	46	N.		N.													Partially overcast throughout	8
	9	30-29	42	30-30	43	46	31			39	38	43	41	N.		S.													Rules Cloudy and misty	9
	10	30-28	43	30-25	43	43	38			41	40	36	33	N.		N.													Partialey overcast throughout	10
	11	30-21	42	30-10	43	45	33			39	38	43	41	S.		S.E.													Partialey overcast A.M. Densely do P.M.	11
	12	29.94	42	29.84	41	43	32			37	35	37	36	S.		S.E.													Passing clouds with fine thin atmosphere	12
	13	29.62	39	29.54	40	45	27			31	30	41	39	S.		E.													Partialey overcast A.M. Densely do P.M.	13
	14	29.52	42	29.66	43	45	38			43	40	41	38	E.		E.													Passing clouds with fine intervals Passing Showers	14
	15	29.79	42	29.76	41	39	26			38	34	39	35	S.		E.													Gales and Cloudy. Threatening rain	15
	16	29.60	41	29.53	42	49	36			47	45	37	35	N.		E.													Densely overcast throughout the day	16
	17	29.55	42	29.61	43	41	36			37	34	38	37	N.		N.													Cloudy throughout Showery at night	17
	18	29.63	42	29.68	40	35	29			31	31	32	31	N.		N.E.													Fine for the season A.M. heavily clouded	18
	19	29.57	37	29.59	39	40	24			34	33	36	34	N.		N.E.													Passing clouds with fine intervals Snow at night	19
	20	29.79	36	29.90	35	29	20			26	25	25	24	S.		S.E.													Bright Sunshine A.M. Cloudy A.M. Partialey overcast P.M.	20
	21	29.98	34	29.49	37	36	19			29	29	35	34	S.		S.E.													Passing clouds A.M. Overcast throughout	21
	22	30-02	35	29.99	35	39	29			31	30	30	30	S.		S.													Very fine A.M. Passing clouds P.M.	22
	23	29.89	34	29.84	34	39	26			28	28	37	37	N.E.		S.													Foggy throughout the day Fair night	23
	24	29.69	32	29.58	33	36	22			27	27	34	32	S.		S.E.													Partialey overcast throughout Showery	24
	25	29.31	35	29.09	38	46	37			36	35	44	43	S.		S.E.													Overcast A.M. Spitting rain Showery P.M.	25
	26	28-88	41	28.80	43	54	40			47	46	48	46	S.		S.													Overcast Passing clouds Spitting rain P.M.	26
	27	28.83	45	28-76	44	47	43			46	44	46	45	S.		S.													Overcast Fine Spitting rain Heavily clouded at night	27
	28	28.77	46	28.84	46	50	40			46	45	45	44	N.		N.													Cloudy throughout the day	28
	29	28.85	46	28-90	46	47	39			46	44	44	43	S.		S.													Passing clouds Spitting rain Misty	29
	30	28.98	46	29.09	46	43	40			42	41	42	42	N.		N.													Variable throughout Heavily overcast	30
	31																													31
Sums.		P.M. 29.765	41.6	A.M. 29.765	42.2	44.2	34.0			1270	1127	1196	1148																	
Means.		29.76	41.6	29.765	42.2	44.2	34.0			39.3	37.6	39.9	38.3																	
Index Errors.																														
Correction for Diurnal Range.‡																														
Corrected Means.																														
No. of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		

Barometer, mean corrected reading of Column No. 1 (A.M.),..... = 29·765 Column No. 3 (P.M.),..... = 29·745 Barometer, Highest observed reading of Month,..... = 30·39 on the 6th

Diameter of tube _____ inch; correction for capillarity to be added,..... + 060 Capillarity,..... = + 060 Lowest do. do.,..... = 28·77 on the 28

Sum,..... 29·825 Sum,..... 29·805 Difference, or Monthly Range,..... = 1·62

Correction for Temperature from Column No. 2 to be deducted,..... = − 035 Temp. from Col. 4,..... = − 037

Sum,..... 29·790 Sum,..... 29·768

Mean of the above ..... 29·779

Correction for Height above Sea-level, _____ feet, to add,..... 210

Barometer corrected and reduced to 32° and Sea-level, ... 29·989

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.
A.M.	2	1	1	4	0	8	9	5		
P.M.	1	2	4	3	5	4	7	4		
	1½	1½	2½	3½	2½	6	8	4½		

Dry bulb Thermometer (mean of Cols. 9 and 11),* ..... 39·8

Wet bulb Thermometer (mean of Cols. 10 and 12),* ..... 38·0

† Dew-point Temperature,..... 35·4

† Elastic Force of Vapour,..... ·207

† Weight of Vapour in a Cubic Foot of Air,..... ·010

† Additional Weight required to Saturate a Cubic Foot,..... 0·5

† Degree of Humidity (Saturation 100),..... 84

Highest Reading Self-Registering Thermometer in Air and Protected, ... 57 on the 28th

Lowest do. do. do., ... 19 on the 21

Difference, being Monthly Range,..... 38

Mean of Self-Registering Thermometers in Air and Protected, ... 39·1

Mean Daily Range in Air and Protected, ... 10·2

Greatest Daily Range, do., ... 18

Highest Reading Self-Registering Black Bulb Thermometer in Sun, ... _____ on the _____

Lowest do. do. from Radiation during Night, _____ on the _____

* If the readings are taken at 9h. and 3h., the 9h. readings to be alone taken to account, as the correction for Diurnal Range in Scotland is unknown.

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Hygrometer.—The *wet* bulb requires the muslin covering it to be often changed. In towns once a month, or oftener, if the weather is dusty, and the muslin gets foul; in the country whenever the muslin seems to be foul. The bulb should be covered with thin tissue or blotting paper below the muslin, and the muslin should always be thoroughly wetted, and freed from starch, before being used; and the cotton wick which conducts moisture to it should be previously soaked in a solution of washing soda, and then in pure water, before being attached, in order that it may be thoroughly wetted, else it will conduct the moisture imperfectly, and yield false results. In frosty weather, water must be poured over the wet bulb, so as to form a thin film of ice on the muslin, the evaporation from the ice going on as from the simply wetted bulb.

Rain Gauge.—As "Fleming's Rain Gauges" seem to possess several advantages over others, the Society gives the preference to them; but whatever form be employed, in order that all the stations may yield comparable results, it is recommended that the Gauge be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of *close cut grass*, in a place as distant as possible from trees, houses, high walls, and irregular or broken ground, and the quantity of Rain should, if possible, be registered daily. When more than one Rain Gauge is kept, they ought to be placed near each other, but at different heights above the ground, and their indications noted in the *general remarks*, mentioning their height above ground—the regular column in the Schedule being reserved for the ground Rain Gauge alone.

Winds.—Isolated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately over head, that is, in or near the zenith of the observer. The motion of the higher strata of clouds gives no such indication. Failing the clouds, the general direction of the smoke of a hamlet or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. For mode of estimating the force of the wind, see "Directions for Reading Instruments;" but in all cases it is better to make use of Lind's Anemometer, as procured at Messrs Adie and Son's, and enter the greatest force of the wind during the period of observation.

Clouds.—The Society recommends observers to adopt the Howard nomenclature of clouds. The scale of cloud in the visible sky is reckoned from 0 to 10. Thus, a sky quite free from cloud is 0; a sky half covered with cloud is 5; and the whole visible sky covered with cloud is 10. Clouds often cover three-fourths or even more of the visible sky without obstructing the sunshine, so that the indications noted in the column for clouds would not necessarily express, or agree with, the column for sunshine. As the full moon, *so long as it is above the horizon*, is thought by some eminent astronomers to have a powerful effect in dispelling clouds, it would be well to note in the General Remarks any facts bearing on this point, for a few days (or nights, as the case may be) before and after every full moon; and the same observations ought to be made at the periods of new moon.

Sunshine.—The number of hours the sun shines during the day should be entered in the proper column.

Thermometers under Ground.—Though the temperature and hygrometric conditions of the air are those which chiefly influence the growth of crops, it is important for the health of the crop, and for the germination of the seed, that the soil itself should have a certain temperature. To collect facts which may illustrate this, it is recommended to have Thermometers sunk 3, 12, and 22 inches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil; and the observer should enter in the Schedule the *kind* of soil; whether drained or undrained; and whether naturally wet or dry.

Temperature of the Sea.—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river water, and as near as may be about the time of high water. A Thermometer, with its bulb fixed in a small tin pitcher, covered with a sloping lid, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. Convenient instruments are furnished by Messrs Adie and Son.

Temperature of Springs.—The temperature of Springs or Deep Wells is recommended to be taken whenever practicable, mentioning whether Spring or Well, and its depth from the surface.

Meteors, Aurora Borealis, Remarkable Depression or Elevation of Barometer, Remarkable Falls of Rain, Hail or *Snow, Thunder* and *Lightning*, etc., should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction.

Budding, Leafing, and *Flowering of Trees.*—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of leafing and flowering. *Individual* Trees or Shrubs of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same plant from year to year being noticed.

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, Princes Street, and at Mr Bryson's, 60, Princes Street, Edinburgh.

Electricity.—Pith balls suspended by a linen thread, in connection with a metallic conductor, and under cover, and the degrees of a circle being used to express the degree of repulsion, form a cheap and convenient Electrometer. Excited glass or sealing-wax ascertains the nature of the electricity.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	In Flower.	Leaf Buds first appear.	In Leaf.	Divested of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder,					Barley,				
Ash,					Bere or Bigg,				
Beech,					Oats,				
Birch,					Wheat,				
Elm,					Beans,				
Larch,					Pease,				
Lime,					Potatoes,				
Oak,					Turnips,				
Sycamore or Plane,					Rye Grass,				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry,		Apple,			Cuckoo,		
Bourtree or Elder,		Black Currant,			Curlew,		
Broom,		Cherry,			House-Swallow,		
Hazel,		Gean,			Lapwing,		
Hawthorn,		Gooseberry,			Plover,		
Holly,		Peach,			Sand-Martin,		
Laburnum,		Pear,			Starling,		
Lilac,		Plum,			Swan,		
Mezereon,		Strawberry,			Rail or Corn Crake,		
Mountain Ash or Rowan,					Other Birds, naming them—		
Red Flowering Currant,							
Rhododendron Ponticum,							
Whin,							

Have the goodness also to state any information you may be able to collect relative to the Crops of Grain, Hay, Potatoes, Turnips, Fruits, etc., whether plentiful, or in perfection; whether any have suffered from blight, disease, etc. Whether Epizootic disease prevails among Cattle; and the Agricultural condition of the district generally.

DALKEITH DE 17 1858

EDINBURGH DE 17 58

ONE PENNY

To

Mr Dalkeith

DR STARK,

Sec., Meteorological Society,

21, Rutland Street,

EDINBURGH.

METEOROLOGICAL RETURNS.

44

SCOTTISH METEOROLOGICAL SOCIETY.

Observations taken at Dalkeith Gardens County of Midlothian, in Lat. ____, Long. ____, Height above Sea 183 feet.

Distance from Sea 3 miles. During the MONTH of December 1857.

Phasis of Moon.	Days of Month.	BAROMETER. 9 h. A.M. Barometer.	Attached Thermometer.	6 h. P.M. Barometer.	Attached Thermometer.	SELF-REGISTERING THERMOMETERS. Protected. Highest in Air.	Lowest in Air.	Exposed. Max. Black bulb in Sun.	Min. Black bulb during Night.	HYGROMETER. 9 h. A.M. Dry bulb.	Wet bulb.	6 h. P.M. Dry bulb.	Wet bulb.	WIND. 9 h. A.M. Direction.	Force ††	6 h. P.M. Direction.	Force ††	RAIN. Days on which it fell.	Amount.	CLOUD. 1 to 10	SUNSHINE. Hours.	THERMOMETERS. under Ground. 9 h. A.M. 3 inches.	12 inches.	22 inches.	Temperature of SPRING or WELL.	SEA. Temperature.	Density.	OZONE. 0 to 10 A.M.	P.M.	ELECTRICITY.	GENERAL REMARKS, As to occurrence of Thunder, Lightning, Storms, Hail, Meteors, Remarkable Depression or Elevation of Barometer, etc. Mention the hour at which these began and ended.	Days of Month.
		inches.	°	inches.	°	°	°	°	°	°	°	°	°					days.	inches.			°	°	°	°	°				°		
	1	29.93	45	29.82	45	47	34			36	35	45	44	S.W		S.W															Misty. Fine. Densely overcast-	1
	2	29.11	47	29.51	46	46	40			45	42	41	39	W.		S.W															Cold Cloudy and wintry	2
	3	29.67	45	29.54	47	52	36			46	42	50	48	S.W		W.															Cloudy and wintry. Squally	3
	4	29.55	48	29.51	47	49	41			43	42	43	41	W.		S.															Misty throughout- Fine day	4
	5	29.81	45	29.93	46	46	36			43	41	46	45	S.W		S.W															Passing Clouds with fine	5
	6	29.99	44	30-00	45	48	36			42	40	41	40	S.W		S.W															Very fine. Aurora Borealis	6
	7	29.88	45	29.97	43	45	34			37	36	35	34	S.W		W.															Particulary overcast- Thro'	7
	8	29.99	41	30-00	47	37	29			33	32	33	32	S.W		S.W															Exceedingly fine throughout	8
	9	30-01	38	30-00	37	33	26			29	28	29	29	S.		S.															Foggy Particulary overcast- fine as at present	9
	10	30-02	37	30-00	37	35	26			30	29	34	32	S.		S.E															Dense fog in Forenoon- Slight	10
	11	29.92	38	29.89	39	40	31			35	34	38	37	S.W		S.E															fine and mild for the season. Slight	11
	12	29.68	40	29.58	41	42	33			40	38	40	39	S.		S.															Cold Cloudy and wintry	12
	13	29.62	42	29.69	42	45	39			42	40	38	36	S.		S.															Densely overcast- Particulary	13
	14	29.92	40	29.99	40	37	31			35	35	31	30	S.		S.															Overcast and wintry do do Sparkling	14
	15	30-00	35	29.98	36	36	24			28	28	31	30	S.		S.E															fine and mild for the Season. Slight	15
	16	29.71	38	29.74	39	40	29			36	34	38	37	S.E		S.															fine and pleasant- Throughout. Snow at night	16
	17	29.71	39	29.60	39	39	33			34	34	36	34	S.		S.E															Unpleasant-day. Hoar frost at night	17
	18	29.14	39	28.91	41	46	32			39	38	44	42	S.E		S.															Cloudy and windy throughout	18
	19	29.02	41	29.09	41	40	33			37	36	36	34	S.W		S.W															Overcast and Misty throughout	19
	20	29.18	40	29.26	41	42	31			40	38	40	39	S.W		S.W															Cloudy and windy Squally rain	20
	21	29.23	41	28.93	44	47	33			40	38	50	48	S.W		W.															Passing Clouds with fine rain and	21
	22	29.82	44	29.81	44	46	43			43	40	43	41	W.		W.															Passing Clouds- do do Showery	22
	23	29.02	43	29.79	46	47	41			43	41	42	42	S.W		S.															Overcast- rain Windy wintry Showery	23
	24	29.03	42	29.19	42	41	38			39	38	39	38	S.		S.															Cloudy high wind. Showery and wintry	24
	25	29.87	43	29.84	41	41	31			39	38	39	38	S.		S.															Densely Overcast and Showery throughout	25
	26	29.09	42	29.15	40	40	37			39	38	39	38	S.		S.															Cloudy and Showery throughout	26
	27	29.80	41	29.83	41	43	32			40	39	38	37	S.W		S.W															Fine Mild day throughout	27
	28	29.72	41	29.68	42	41	31			41	40	39	37	S.W		S.W															Dense fog rain. Fine Showery	28
	29	29.62	39	29.79	40	36	30			35	33	35	34	S.W		S.W															Cloudy but Mild throughout	29
	30	29.74	40	29.82	42	43	31			41	40	42	41	W.		W.															Pleasant- throughout- Cloudy	30
	31	29.89	45	29.81	45	47	34			40	40	46	44	W.		W.															Cloudy and Misty throughout	31
Sums.		918.70	1289	917.33		1321	1085			1192		1220	1179																			
Means.		29.635	41.6	29.640	42.1	42.6	33.4			38.4	.1	.4	38.1																			
Index Errors.																																
Correction for Diurnal Range.‡																																
Corrected Means.																																
No. of Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25		26	27			

Barometer, mean corrected reading of Column No. 1 (A.M.),..... = 29.635
Diameter of tube ____ inch; correction for capillarity to be added..... + .060
Sum,..... 29.695
Correction for Temperature from Column No. 2 to be deducted,..... = − .036
Sum,..... 29.659

Column No. 3 (P.M.),..... = 29.640
Capillarity,..... = + .060
Sum,..... 29.700
Temp. from Col. 4,..... = − .037
Sum,..... 29.663

Mean of the above 29.661
Correction for Height above Sea-level, 183 feet, to add,..... .214
Barometer corrected and reduced to 32° and Sea-level, ... 29.875

Barometer, Highest observed reading of Month,..... = 30-02 on the 10th
Lowest do. do.,..... = 28.91 on the 18th
Difference, or Monthly Range,..... = 1.11

SUMMARY OF THE WINDS.

Direction.	N	NE	E	SE	S	SW	W	NW	Calm or Variable.	Mean Force.	Mean Velocity in miles per day.
A.M.	0	0	0	2	10	14	5	0			
P.M.	0	0	0	4	11	10	6	0			
Mean.	0	0	0	3	10½	12	5½	0			

Dry bulb Thermometer (mean of Cols. 9 and 11),*..... 38.9
Wet bulb Thermometer (mean of Cols. 10 and 12),*..... 37.6
† Dew-point Temperature,..... 35.9
† Elastic Force of Vapour,..... .212 inch
† Weight of Vapour in a Cubic Foot of Air,..... 2.49 grs
† Additional Weight required to Saturate a Cubic Foot,.....
† Degree of Humidity (Saturation 100),..... 90

Highest Reading Self-Registering Thermometer in Air and Protected,..... 52 on the 3rd
Lowest do. do. do.,..... 24 on the 15th
Difference, being Monthly Range,..... 28
Mean of Self-Registering Thermometers in Air and Protected,..... 38.0
Mean Daily Range in Air and Protected,..... 9.2
Greatest Daily Range, do.,..... 18 on the 21st
Highest Reading Self-Registering Black Bulb Thermometer in Sun,..... ____ on the ____
Lowest do. do. from Radiation during Night, ____ on the ____

(Signed) Wm Bowman
(Designation) Gardener

†† In the above columns for the registration of the Force of the Wind, may be entered the *number of revolutions*, by Professor Robinson's Cup Wind Gauge, which registers the velocity of the Wind—540 revolutions being equal to one statute mile.
* If the readings are taken at 9h and 3h, the 9h readings to be alone taken to account, as the correction for Diurnal Range in Scotland is unknown.
† All these calculated from Glaisher's Hygrometric Tables, Second Edition *only*.
‡ The Diurnal Range for Scotland is as yet unknown.

N.B.—This Schedule should be returned (post-paid) as early as possible after the completion of the Month, with the Sums correctly added, and the Means deduced. No Wax or Wafers ever to be employed in closing the Schedule—the Gummed Corner to be alone used.

Dec 1858 To

DR STARK,

Sec., Meteorological Society,

21, Rutland Street,

EDINBURGH.

Dalkeith

DALKEITH JA 13 1859

EDINBURGH JA 13 59 C+

METEOROLOGICAL RETURNS.

OBSERVATIONS IN CONNECTION WITH THE PERIODICAL RETURN OF THE SEASONS.

FOREST TREES.	In Flower.	Leaf Buds first appear.	In Leaf.	Divested of Leaves.	CROPS, mentioning variety.	Sowing or Planting.	Appearing above Ground.	In Ear or Flower.	First Cut or Raised.
Alder, ...					Barley, ...				
Ash, ...					Bere or Bigg, ...				
Beech, ...					Oats, ...				
Birch, ...					Wheat, ...				
Elm, ...					Beans, ...				
Larch, ...					Pease, ...				
Lime, ...					Potatoes, ...				
Oak, ...					Turnips, ...				
Sycamore or Plane...					Rye Grass, ...				

SHRUBS, ETC.	First in Blossom.	FRUITS.	First in Blossom.	Fruit Ripe generally.	MIGRATORY BIRDS.	First Arrival.	Departure.
Barberry, ...		Apple, ...			Cuckoo, ...		
Bourtree or Elder, ...		Black Currant, ...			Curlew, ...		
Broom, ...		Cherry, ...			House-Swallow, ...		
Hazel, ...		Gean, ...			Lapwing, ...		
Hawthorn, ...		Gooseberry, ...			Plover, ...		
Holly, ...		Peach, ...			Sand-Martin, ...		
Laburnum, ...		Pear, ...			Starling, ...		
Lilac, ...		Plum, ...			Swan, ...		
Mezereon, ...		Strawberry, ...			Rail or Corn Crake, ...		
Mountain Ash or Rowan,...					Other Birds, naming them—		
Red Flowering Currant,.....							
Rhododendron Ponticum, ...							
Whin, ...							

Have the goodness also to state any information you may be able to collect relative to the Crops of Grain, Hay, Potatoes, Turnips, Fruits, etc., whether plentiful, or in perfection; whether any have suffered from blight, disease, etc. Whether Epizootic disease prevails among Cattle; and the Agricultural condition of the district generally.

INSTRUCTIONS FOR MAKING METEOROLOGICAL OBSERVATIONS.

THOSE persons who kindly furnish Monthly Tables of the Weather to the Scottish Meteorological Society are requested to attend to the following Instructions, seeing that one of the most important ends of Meteorological Observations is their being comparable with one another; and for this purpose it is requisite that all should, if possible, observe at a like hour, and in a like manner, and have their instruments placed, in so far as circumstances allow, in a like position:

Hour of Observation.—All instruments which are observed twice a-day, should be read at the same hour morning and evening, in order to furnish mean results. The Society recommends *a quarter before nine o'clock, morning and evening*, as the most convenient hour; but should this be inconvenient for the observer, another hour may be chosen, attending, however, to the above rule, that the evening and morning readings be taken at the same hour, and this hour entered on the Schedule.

Barometer.—Barometers of Messrs Adie and Son's construction are recommended; but any instruments may be used which have adjustable surfaces, and have been compared. Before this instrument is suspended for use it should be examined, in order to ascertain whether the space above the mercury is free from air. This is done by inclining the instrument somewhat from the vertical position, when, if free from air, the mercury will strike against the upper end of the tube with a sharp tap. The mercury should then completely fill the tube. If any air has got admittance, it should be driven into the cistern by reversing the instrument, and tapping it gently with the hand. If it cannot be thus expelled, the instrument is useless till repaired.

The Barometer should be hung in a good light, and perfectly perpendicular, as ascertained by the plumb line; and it ought always to be gently tapped before taking the reading, to prevent adhesion of the mercury to the tube. In reading, the eye ought to be placed on the exact level of the top of the column of mercury. The reading of the attached Thermometer ought always to be the first taken, as the heat of the breath, or the proximity of the person, are apt to influence its readings.

The corrections necessary to be applied to the Barometric readings depend on the form of the instrument. The mode of making these corrections, and the tables employed for the purpose, will be found in the "Report of the Committee of the Royal Society on Physics and Meteorology," 1840, price 1s. The daily readings of the Barometer ought to be entered on the Schedule *as read off*, and the corrections only applied to the mean for the month.

Self-Registering Thermometers and Hygrometer.—These should be placed alongside of each other, in a place freely exposed to the air, but protected from sunshine, and from reflected heat, as well as from radiation and from rain, and as near as may be *four feet* from the general surface of the ground. Different contrivances are used for this purpose, either a double ventilated box with louvre-boarded sides, fixed at a north window, and projecting 12 inches from the wall, so as to allow a free current of air to pass between the box and the wall; or in a double meat-safe ventilated box with louvre-boarded sides, fixed in an exposed place, and if possible over grass. Whatever means are finally decided on, the position of the instruments should be mentioned, and should not be changed (without due notice being given to the Secretary), in order that the results of one month's observations may be strictly comparable with those of another.

The *Self-Registering Thermometers* should be placed exactly horizontal. In the case of the ordinary *maximum* Thermometer, with clay, glass, or steel index, the bulb may be *very slightly* elevated, in order that the mercurial column may be somewhat aided by the force of gravity in pushing forward the float or index; and in the case of the *minimum* Thermometer, the bulb must be slightly depressed, to prevent a draining of the spirit to the top of the tube, and also that any part raised in vapour may return to the column. These Thermometers, if read once a-day, should *always be read on the evenings*, so that the temperatures marked by the floats indicate the minimum and the maximum of the day on which the reading is taken. N.B.—The readings of these instruments are taken from that extremity of the float which is nearest the *head of the column* of mercury or of spirit.

The *maximum* Registering Thermometer, for taking the extreme heat of the sun's rays, should have its bulb blackened and the surface rendered dull, and it should be mounted in a blackened box, whose sides should be so high as to protect the bulb from wind. It should be so placed that the sun's rays have free access to it during the heat of the day.

The *minimum* Registering Thermometer, for ascertaining the lowest temperature during the night from radiation, should have its bulb similarly blackened and rendered dull, and be similarly mounted. It should be laid out, about sunset, over grass, in a place freely exposed to the sky, but raised on wooden supports a few inches above the surface, and removed during the day.

Hygrometer.—The *wet* bulb requires the muslin covering it to be often changed. In towns once a month, or oftener, if the weather is dusty, and the muslin gets foul; in the country whenever the muslin seems to be foul. The muslin should always be thoroughly wetted, and freed from starch, before being used; and the cotton wick which conducts moisture to it should be thoroughly wetted, else it will conduct the moisture imperfectly, and yield false results. The cotton wick is best attached by passing its extremity through an aperture in the centre of the muslin, spreading that portion out so as to apply equally round the bulb, and then tying the muslin over the bulb. In frosty weather, water must be poured over the wet bulb, so as to form a thin film of ice on the muslin, the evaporation from the ice going on as from the simply wetted bulb.

Rain Gauge.—As "Fleming's Rain Gauges" seem to possess several advantages over others, the Society gives the preference to them; but whatever form be employed, in order that all the stations may yield comparable results, it is recommended that the Gauge be sunk in the ground, so that the top of the receiver is nearly on a level with the top blades of *close cut grass*, in a place as distant as possible from trees, houses, high walls, and irregular or broken ground, and *the quantity of Rain, should, if possible, be registered daily*. When more than one Rain Gauge is kept, they ought to be placed near each other, but at different heights above the ground, and their indications noted in the *general remarks*, mentioning their height above ground—the regular column in the Schedule being reserved for the ground Rain Gauge alone.

Winds.—Isolated Wind-vanes or Weather-cocks are apt to give false indications of the general direction of the wind, in consequence of the currents of air at the surface of the ground being so much influenced by the neighbourhood of hills, valleys, buildings, etc. Where low clouds are seen drifting along, their direction in reference to known objects, or as noted by means of a mirror on which a compass may be laid, or by means of a circular mirror fixed over the centre of a pocket compass, will, in general, give the true direction of the current of air near the earth's surface if these clouds are near and immediately over head, that is, in or near the zenith of the observer. The motion of the higher strata of clouds gives no such indication. Failing the clouds, the general direction of the smoke of a hamlet or village, or of a tall chimney, gives a better indication of the general direction of the wind than any wind-vane. The observer should state whether he has ascertained the direction by reflection or otherwise. For mode of estimating the force of the wind, see "Directions for Reading Instruments." Lind's Anemometer is commonly used for this purpose, but the best Anemometer of moderate price yet invented is Professor Robinson's Cup Wind Gauge, which registers the velocity of the wind,—540 revolutions of the cups, as registered by the instrument, being equal to one statute mile.

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Sunshine.—The number of hours the sun shines during the day should be entered in the proper column.

Thermometers under Ground.—Though the temperature and hygrometric conditions of the air are those which chiefly influence the growth of crops, it is important for the health of the crop, and for the germination of the seed, that the soil itself should have a certain temperature. To collect facts which may illustrate this, it is recommended to have Thermometers sunk 3, 12, and 22 inches below the surface of the ground, to ascertain the temperature of what may be termed the agricultural soil; and the observer should enter in the Schedule the *kind* of soil; whether drained or undrained; and whether naturally wet or dry.

Temperature of the Sea.—As the meteorology of the island is incomplete without a knowledge of the mean temperature of the Ocean which surrounds it, the Society strongly recommends taking the temperature of the Sea at a depth of 6 feet or 1 fathom from the end of all piers or rocks round the coast, where free from the influence of river water, and as near as may be about the time of high water. A Thermometer, with its bulb fixed in a small tin pitcher, covered with a sloping lid, and with a weight attached, is sunk to the required depth, and in ten minutes drawn up and read. The density of the sea water should, if possible, be taken at the same time. Convenient instruments are furnished by Messrs Adie and Son.

Temperature of Springs.—The temperature of Springs or Deep Wells is recommended to be taken whenever practicable, mentioning whether Spring or Well, and its depth from the surface.

Meteors, Aurora Borealis, Remarkable Depression or Elevation of Barometer, Remarkable Falls of Rain, Hail or Snow, Thunder and Lightning, etc., should be specially noticed, together with the exact hour at which they were first seen, their continuance, and direction.

Budding, Leafing, and *Flowering of Trees.*—It is necessary to bear in mind that varieties of the same species of tree differ widely in their times of leafing and flowering. *Individual* Trees or Shrubs of each kind should therefore be chosen (if possible early kinds), and their indications should be alone noted—always the same plant from year to year being noticed.

Ozone.—Mention whether Schonbein's or Moffat's scale and papers are used. Schonbein's are preferred. They may be had at Messrs Adie and Son's, 50, Princes Street, and at Mr Bryson's, 60, Princes Street, Edinburgh.

Electricity.—Pith balls suspended by a linen thread, in connection with a metallic conductor, and under cover, and the degrees of a circle being used to express the degree of repulsion, form a cheap and convenient Electrometer. Excited glass or sealing-wax ascertains the nature of the electricity.

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